

MODELING RELATIONS BETWEEN ADOLESCENTS' PERCEPTIONS
OF THE SCHOOL'S SOCIAL CONTEXT, ACADEMIC AND SOCIAL SELF-CONCEPT
OF ABILITY BELIEFS, AND STUDENT ENGAGEMENT

Belinda L. Locke

A dissertation submitted to the faculty at the University of North Carolina at Chapel Hill
in partial fulfillment of the requirements for the degree of Doctorate of Education
in the School of Education.

Chapel Hill
2014

Approved by:

Judith Meece

Jill Hamm

Matthew Irvin

Steven Knotek

William Ware

© 2014
Belinda L. Locke
ALL RIGHTS RESERVED

ABSTRACT

Belinda L. Locke: Modeling relations between adolescents' perceptions of the school's social context, academic and social self-concept of ability beliefs, and student engagement
(Under the direction of Judith L. Meece)

Research on achievement motivation posits associations between students' perceptions of the school environment, psychological processes, and desired educational outcomes (e.g., Durik, Vida, & Eccles, 2006; Patrick, Ryan, & Kaplan, 2007; Skinner, Furrer, Marchand, & Kindermann, 2008; Wentzel, Battle, Russell, & Looney, 2010). Clarification of the nature and influence of school contexts, and advancement of insight into the processes by which school-based social relations influence individual outcomes, represent important tasks for research on schools and development (Janosz, 2012). This work advances this agenda by emphasizing adolescents' perceptions of the social context as a key component of the school environment that shapes student engagement. The research draws on a self-systems motivational perspective to investigate the intertwining nature of social, self, and academic processes. The study employs structural equation modeling (SEM) techniques to evaluate a model of student engagement in which self-concept of ability beliefs mediate the relationship between perceptions of the social context and behavior. The work also examines the moderating effects of gender and race as social identities that influence associations between perceptions of the social context, motivation, and engagement. Findings have the potential to inform ongoing school reform efforts to reflect best practices geared toward increasing the motivation, engagement, and inevitably the learning and achievement of all students.

ACKNOWLEDGEMENTS

I would like to express my sincere gratitude to all who supported and challenged me throughout the process of completing my doctoral studies and dissertation. First, I would like to thank Dr. Jacqueline Eccles, the Director of the Gender and Achievement Research Program for sharing the data which I used to complete this dissertation study. Her extensive research programs into the roles of psychological and contextual factors on development and achievement-related choices are an inspiration to all nascent scholars in the field of Educational Psychology.

My advisor, Dr. Judith Meece offered invaluable expertise, encouragement, and patience. Her mentorship will continue to influence me across my career as a scholar and an educator. I am grateful for and humbled by the breadth and depth of knowledge that each of my committee members contributed to the project. I would like to extend a particularly heartfelt thanks to Dr. William Ware. Dr. Ware's knowledge and commitment to student success contributed to a welcome but unexpected new interest in advanced statistical techniques and quantitative analyses.

I would also like to recognize the power of the unwavering support of family and friends. Marion Brisk and my parents Norman and Kathleen Locke supported and believed in me every step of the way. The Williams' family provided a lovely refuge and a place to curl up, sip tea, and get away from "The Project" as needed. My cohort peers, Karyl Askew and Michael Petersen shared encouragement, insight, and commiseration along the way. I couldn't have done it without you.

TABLE OF CONTENTS

LIST OF TABLES.....	vii
LIST OF FIGURES.....	viii
CHAPTER 1: INTRODUCTION.....	1
Student Engagement Matters.....	3
Theoretical Overview.....	6
Purpose of the Research Study.....	9
Summary.....	10
CHAPTER 2: LITERATURE REVIEW.....	11
Student Engagement as a Vital Goal of Schooling.....	12
Student Engagement within a Self-Systems Framework.....	14
Social Context and Student Engagement.....	17
Social Support and Student Engagement.....	17
School Climate and Student Engagement.....	23
Summary of Research on Schools' Social Contexts and Student Engagement.....	27
Competence Beliefs as Mediators.....	28
Academic Competence Beliefs.....	29
Social Competence Beliefs.....	33
Gender and Race as Moderators.....	35
Gender, the Social Context of Schools, and Student Engagement.....	35

Race, the Social Context of Schools, and Student Engagement.....	38
Summary of Literature Review.....	41
Research Questions and Hypotheses.....	42
Direct Effects.....	42
Indirect or Mediated Effects.....	43
Moderation.....	43
CHAPTER 3: METHODS.....	45
Participants.....	46
Data Collection.....	47
Measures.....	48
Independent Variable.....	48
Mediating Variables.....	49
Outcome Variable.....	50
Moderators and Covariates.....	51
Scale Reliability.....	52
Data Preparation.....	53
Data Screening.....	53
Missing Data.....	54
Analytic Plan.....	55
Preliminary Analyses.....	59
Estimating the Structural Models.....	66
Summary.....	67
CHAPTER 4: RESULTS.....	69

Descriptive Statistics.....	69
Preliminary Analyses.....	71
Results of Confirmatory Factor Analysis.....	71
Measurement Invariance.....	74
Primary Analyses.....	83
Moderation in the Model.....	84
SEM Results for the Gender Model.....	84
SEM Results for the Race Model.....	86
Post Hoc Analyses.....	92
Summary of SEM Results.....	95
CHAPTER 5: DISCUSSION.....	97
A Self-Systems Model of Student Engagement.....	97
Mediation in the Model.....	98
Direct Effects in the Model.....	103
Moderation in the Model.....	113
Summary of Findings.....	114
Implications for Future Research.....	114
Implications for Practice.....	120
Limitations of the Study.....	123
Concluding Remarks.....	126
APPENDIX A: FREQUENCIES AND PERCENTAGES FOR CATEGORICAL VARIABLES.....	129
APPENDIX B: FREQUENCIES, PERCENTAGES, AND INVARIANCE MODELS FOR CATEGORICAL VARIABLES SAMPLE V2.....	133

REFERENCES.....136

LIST OF TABLES

Table 3.1	Descriptive statistics for the full sample prior to recoding.....	56
Table 3.2	Summary of missing data in calibration and validation samples.....	58
Table 4.1	Descriptive statistics for ordinal indicators of latent factors.....	70
Table 4.2	Goodness of fit indices for the revised baseline measurement model.....	73
Table 4.3	Baseline measurement model: Factor loadings and scale reliability estimates.....	75
Table 4.4	Invariance models for the four-factor model of student engagement.....	81
Table 4.5	p values of path estimates in gender model for calibration, validation, and V2 samples.....	93
Table 4.6	p values of path estimates in racial model for calibration, and validation samples.....	94

LIST OF FIGURES

Figure 1 Basic self-systems model of motivational development.....	9
Figure 2 Basic structural model.....	16
Figure 3 Final baseline measurement model.....	63
Figure 4 Results of the full model for adolescent girls.....	88
Figure 5 Results of the full model for adolescent boys.....	89
Figure 6 Results of the full model for African American adolescents.....	90
Figure 7 Results of the full model for White adolescents.....	91

CHAPTER 1: INTRODUCTION

Stories focused on evocative topics such as bullying and school violence receive extensive attention from mainstream media outlets in the United States (Fanning, 2008; Hirsch & Lowen, 2012; Shevlin, 2010), while equally critical topics such as student engagement with schooling are relatively unreported. In the context of this dissertation study, student engagement signifies the behavioral expression of motivation (Skinner & Pitzer, 2012), a process that initiates and directs behavior toward meeting needs or accomplishing goals (Shunk, Pintrich, & Meece, 2008). As such, engagement represents an important focus of inquiry. Extant research demonstrates positive associations between indicators of student engagement, academic performance, and educational attainment (Brand, Felner, Shim, Seitsinger, & Duman, 2003; National Research Council & Institute of Medicine, 2004; Skinner, Furrer, Marchand, & Kindermann, 2008; Wang & Eccles, 2012). In contrast, findings point to a link between student disengagement and negative educational outcomes including poor academic performance, behavioral problems, and an increased likelihood of dropping out of the educational pipeline before high school graduation (Balfanz, Herzog, & Mac Iver, 2007). Unfortunately, although we can require young people to attend school, we cannot mandate a level of engagement necessary to construct the knowledge and skills needed to succeed in a contemporary cultural milieu (National Research Council & Institute of Medicine, 2004).

This study examined student engagement in a sample of youth who participated in the Maryland Adolescent Development in Context Study ([MADICS] Eccles, 1997). The

original sample of target adolescents included seventh graders who attended one of the 23 junior high schools across one county in Maryland. These schools were characterized as racially diverse and served adolescents and families who lived in rural, suburban, and urban neighborhoods. The current research was informed by the Self-Systems Model of Motivational Development ([SSMMD] Connell, 1990; Connell & Wellborn, 1991; Skinner & Wellborn, 1994). Within this theoretical framework, environmental or contextual influences and self-processes comprise a motivational system that can contribute to or undermine student engagement. MADICS was designed to investigate the influences of neighborhood, family, school, and peer contexts on psychological determinants that affect individual choices and behavior; therefore, the data were appropriate for use in the evaluation of the hypothesized model.

A body of research on achievement motivation supports a self-systems perspective that posits associations between students' perceptions of the school environment, psychological processes, and desired educational outcomes (e.g., Durik, Vida, & Eccles, 2006; Patrick, Ryan, & Kaplan, 2007; Skinner et al., 2008; Wentzel, Battle, Russell, & Looney, 2010). Clarification of the nature and influence of school contexts, and advancement of insight into the processes by which school-based social relations influence individual outcomes, represent important tasks for ongoing research on schools and development (Janosz, 2012). The work presented here advances this agenda by emphasizing adolescents' perceptions of the social context as a key component of the school environment that shapes student engagement. In alignment with the SSMMD, this study focused on self-appraisal as a psychological process through which school contexts shape student behavior. In addition, the study investigated the potential influences of gender and race as individual

characteristics that impact human perceptions and experiences. This chapter lays a foundation for the research project by (a) establishing the import of student engagement, (b) introducing the theoretical framework informing the work, and (c) outlining the study's purpose.

Student Engagement Matters

Graduation from high school significantly increases the probability of employment and earning a living wage, whereas failure to complete high school is associated with lifelong disadvantages such as chronic poverty, decreased life satisfaction, and psychological distress (Creed, Muller, & Patton, 2003; Laird, Cataldi, Kewal Ramani, & Chapman, 2008; Sum, Khatiwada, McLaughlin, & Palma, 2009). In addition to consequences that affect individuals and families, failure to complete high school implies a loss of human capital vital to the maintenance of community, state, and national prosperity because a well-educated workforce is paramount to meeting the challenges associated with the nation's rapidly shifting economic landscape (Autor, 2010). In light of these considerations, a prevalent lack of school engagement among adolescents in the United States (Bridgeland, DiIulio, & Morison, 2006; Wigfield, Eccles, Schiefele, Roeser, & Davis-Kean, 2006; Yazzie-Mintz, 2009) gives cause for concern. Studies characterize 40% to 60% of U.S. high school students as persistently disengaged from the academic purposes of schooling (National Research Council & Institute of Medicine, 2004). Declines in academic motivation and engagement cut across group membership. However the problem appears more pervasive in urban schools or schools that serve large numbers of racial minority and/or economically disadvantaged students and families (Aud et al., 2012; National Research Council & Institute of Medicine, 2004). Concern over school motivation and the academic achievement of our nation's youth

continues to escalate as standardized test scores and graduation rates in the United States lag behind those of many industrialized nations (Miller & Warren, 2011; Organization for Economic Cooperation and Development, 2010).

The No Child Left Behind Act (NCLB), signed into law by President George W. Bush in 2002, sparked scrutiny of schools and the academic achievement of the nation's youth. The legislation represented an attempt to improve public education through funding initiatives and reforms constructed around standardized testing and measures of school-level accountability. Results to date suggest this legislative effort has been ineffectual. In 2010, 38% of the nation's public schools failed to meet standards for raising student achievement required for receipt of federal funding under NCLB (Usher, 2011). The legislative focus on elevated expectations for schools, teachers, and students is laudable. However, higher expectations have not been a sufficient means to improve achievement in the absence of measures that emphasize the development of students' motivation and engagement with schooling (National Research Council & Institute of Medicine, 2004). Legislative revisions are underway as schools across the country struggle to meet mandates put forth by NCLB. Scholarship is needed to direct reform efforts toward policies and practices grounded in research on human motivation, learning, and development. Thoughtful and informed decisions in terms of the practices of schooling and education are always warranted and are particularly essential during times marked by significant social and economic transitions.

In regards to educational reform, we must bear in mind contemporary social conditions that impact adolescents through the shaping of culture and pathways available to adulthood (Arnett, 2012). An aging population (U.S. Census Bureau, 2010) signifies new limitations on funding for schooling. Globalization and rapidly evolving labor markets

represent new opportunities and uncertainties. A reduction in the number and type of jobs available in the United States and more specialized training and/or formal education needed to compete for entry level positions (U.S. Department of Labor, 2007) represent significant factors bearing influence on the transition to adulthood. Educational attainment is increasingly important as one third of all new jobs in the coming decade will require some form of postsecondary training (U.S. Bureau of Labor Statistics, 2012). These circumstances clearly point to education as an increasingly requisite form of social capital and underscore the importance of insights into the factors and processes that influence student engagement.

Moreover, by roughly midcentury, demographics are expected to reflect a minority-majority. It is projected that persons of color soon will represent more than half of the U.S. population. This trend is evident in public schools where 44% of students hold membership in racial/ethnic groups characterized as non-White (National Center for Education Statistics [NCES], 2010). Increasing racial/ethnic diversity brings about the possibility of an upsurge in undereducation and its associated consequences as current figures indicate African American and Latino youth are substantially more likely than their White counterparts to drop out of school (Aud et al., 2012; NCES, 2009). One nationally representative study reported less than half of all African American males enrolled in public schools and scheduled to graduate in 2008 successfully completed the requirements to earn a high school diploma (Holzman, 2010). A persistent Black-White achievement gap, the increased probability of school failure for African American and Latino students, and gendered patterns of school performance (Lee, 2006; Meece & Askew, 2011; Quintana et al., 2012) continue to define race and gender as salient and challenging educational issues. If no steps are taken to interrupt current trends in school failure and dropout rates, a significant portion of the

nation's population will be at an increased risk of experiencing unemployment or underemployment, as well as a heightened risk of living in poverty.

In light of research that highlights a pervasive lack of student engagement among U.S. adolescents, efforts are justified to examine the pathways and processes through which social participation in school contexts influence the motivational beliefs and academic engagement of all students. Furthermore, research that broadens our understanding of the development of student engagement in historically underserved populations is crucial to inform school efforts aimed toward increasing the educational achievement and persistence of students who are most at risk for school failure and associated difficulties. Focused attempts to enhance the school engagement of underperforming groups not only represent the right thing to do in terms of promoting a more equitable system of public education but also represent the prudent thing to do in preparation for the not so distant future when students of color will represent more than half of all persons entering the U.S. workforce.

Theoretical Overview

Education plays a critical role in the sustainability of individual and national welfare. Therefore, it is decidedly problematic that motivation, a critical resource that undergirds student engagement and academic achievement, often declines as youth matriculate from elementary schools through secondary schools (Fredricks & Eccles, 2002; Jacobs, Lanza, Osgood, Eccles, & Wigfield, 2002; Wigfield et al., 2006). In recognition of the influences of interpersonal and intrapersonal contexts on achievement motivation, this study evaluated a model in which select social and self-processes, independently and jointly, contributed to adolescents' engagement with schooling. Social and self-processes together form the basis of the SSMMD (Connell, 1990; Connell & Wellborn, 1991). This framework offered sound

scaffolding for the model put forth here because it emphasizes the self in social context and engagement as an expression of motivation tied to positive educational outcomes. A theoretical orientation that emphasizes the roles of social and self-processes in the development of adolescents' school engagement is appropriate here because social participation and identity formation hold unique import in the second decade of life (Brown & Larson, 2009; Erikson, 1968; Hamm & Zhang, 2010).

According to the SSMMD, students' relatively stable appraisals of their own competence, autonomy, and relatedness¹ constitute self-systems processes (Connell & Wellborn, 1991) that signify the motivational basis for engagement with tasks and activities that delineate the academic purposes of schooling. Several studies support the fundamental assertions of the self-systems framework that students are more likely to be positively engaged at school when they feel (a) competent to achieve desired outcomes (Ahmed, Minnaert, van der Werf, & Kuyper, 2010; Chouinard, Karsenti, & Roy, 2007; Durik et al., 2006; Patrick et al., 2007; Sakiz, Pape, & Hoy, 2012; Wang, 2009); (b) capable of initiating personally meaningful action toward meeting valued goals (Cho, Weinstein, & Wicker, 2011; Dieseth, Danielsen, & Samdal, 2012; Roth, Assor, Niemiec, Ryan & Deci, 2009); and (c) a strong sense of relatedness (i.e., belonging, connection, attachment) to the school community (Demanet & Van Houtte, 2012; Pittman & Richmond, 2007; Walker & Greene, 2009; Wang & Eccles, 2012). However, in light of shifting social circumstances, effective responses to educational challenges require a commitment to move beyond a focus on individually oriented paradigms of motivation. Propitiously, theoretical perspectives and

¹ In this study, relatedness is measured as generalized perceptions of school-wide sense of belonging. As such, sense of belonging signifies a dimension of the school context rather than a self-process. The underlying assumption here is that in a school climate characterized by students who feel a strong sense of school belonging, sense of belonging represents a social norm, and that this norm can exert influence on individual students' behaviors and dispositions (see Lapinski & Rimal, 2005).

empirical literature that emphasize achievement motivation increasingly reflect emphasis on the developmental contributions of social contexts and processes (Martin & Dowson, 2009; Ryan & Shim, 2008; Wentzel, 2010).

Educational scholarship increasingly draws on theories that recognize multiple and overlapping contexts that influence diverse aspects of students' lives. For example, Urie Bronfennbrenner's ecological model of human development (1979) laid the foundation for the emergence of a variety of models that advance insight into the ways in which dimensions of schools, families, and community environments contribute to learning and development (e.g., Eccles & Roeser, 2009). School interventions highlighted in Meece and Eccles (2010) and ongoing research conducted as a part of the Rural Early Adolescent Learning Program (e.g., Hamm, Schmid, Farmer, & Locke, 2011; Hamm & Faircloth, 2005) underscore the significant role of perceptions and experiences of school contexts in support of adjustment and achievement-related outcomes. These programs add to a growing body of literature linking social participation with markers of achievement motivation in educational settings (e.g., Kindermann & Skinner, 2009; Wang & Eccles, 2012; Wentzel, 2010).

While competence, autonomy, and relatedness are identified as basic psychological needs, and appraisal of one's own competence, autonomy, and relatedness as the source of motivated action, the SSMMD locates the origins of self-appraisals within the ongoing activities that characterize a particular social context (Connell & Wellborn, 1991). The extent to which one's basic psychological needs are fulfilled or are thwarted by participation in a defined social context influences self-referent beliefs that in turn motivate behavior and/or action. Within this schema, self-systems, or more specifically, self-appraisals of competence, autonomy, and relatedness, mediate between contextual influences and

motivated behaviors or actions (Figure 1). From an educational standpoint, when features of a school's context facilitate a student's sense of self as competent, autonomous, and socially connected, the student is more likely to become engaged, rather than disengaged, in the tasks and purposes of schooling (Skinner et al., 2008).



Figure 1. Basic self-systems model of motivational development.

Purpose of the Research Study

In light of the far-reaching developmental influences of schools and schooling, research programs in education and psychology must attend closely to the processes that operate within school contexts and assist students in developing belief systems that undergird academic motivation and engagement. While multiple processes define the social context of schooling (Skinner, Kindermann, Connell, & Wellborn, 2009), the current work draws on well-established developmental premises to highlight the contributions of social relations and self-appraisals to adolescents' engagement with schooling. The first emphasis reflects the position that social relationships take on increased developmental significance during adolescence (Brown & Larson, 2009; Hamm & Zhang, 2010). The emphasis on self-appraisal draws on the premise that the process of establishing a stable identity or sense of one's self represents the primary developmental task associated with adolescence (Erikson, 1968). Building on these assumptions, this study used secondary data collected during the first wave of MADICS to examine connections between adolescents' perceptions of school-based social contexts, self-concept of ability beliefs, and student engagement.

Drawing on Connell and Wellborn's SSMMD (1991), the primary research question addressed by this study is this: If adolescents perceive the school environment as a supportive social context, are they more likely to develop views of the self as competent within the school community, and in turn are they more likely to enact behaviors indicative of student engagement such as attendance, effort, and compliance? In light of the potential influence of individual characteristics on the relations between social contexts and individual outcomes, the study evaluated the role of race and gender in shaping associations between adolescents' perceptions of school-based social environments and student engagement.

Summary

Briefly, this study draws on insights advanced by prominent reports and research on achievement motivation. The research draws on a self-systems motivational perspective to investigate the intertwining nature of social, self, and academic processes. More specifically, the study employs structural equation modeling (SEM) techniques to examine pathways that link the social context of schooling with adolescent learners' self-concept of ability beliefs and behaviors indicative of student engagement. In conjunction with the evaluation of a model of student engagement in which self-concept of ability beliefs mediate the relationship between context and behavior, the work examines the moderating effects of gender and race as key social identities that influence associations between school-based social context, motivational beliefs, and engagement. Findings have the potential to inform ongoing school reform efforts to reflect best practices geared toward increasing the motivation, engagement, and inevitably the learning and achievement of all students.

CHAPTER 2: LITERATURE REVIEW

Over the course of the last decade, psychological research has increasingly recognized student engagement as a critical construct related to school motivation and achievement. This research reflects various definitions of student engagement. Current thinking defines the construct in terms of multiple dimensions inclusive of behavioral, cognitive, and affective types of involvement within the school community (Finn & Zimmer, 2012). Within the context of this dissertation study, *engagement* and related terminologies such as student, school, or academic engagement refer to observable actions such as attendance, compliance with school or classroom rules, and expression of effort toward meeting the academic demands of the educational environment. The choice to emphasize behavioral engagement is predicated on several factors. First, the literature overwhelmingly supports a strong correlation between behavioral engagement and academic outcomes and identifies behavioral indicators such as attendance, compliance, and effort as fundamental actions critical to achieving school success (Finn & Zimmer, 2012; Furrer & Skinner, 2003; Ripski & Gregory, 2009). Second, whereas the development of cognitive and emotional engagement has been shown to overlap, evidence suggests different circumstances, processes, or pathways contributing to behavioral engagement with schooling (Archimbault, Janosz, Morizot, & Pagani, 2009). In addition, data from the Maryland Adolescent Development in Context Study (MADICS) provides a rich source of information highlighting student behavior. Notably, aspects of behavioral engagement are observable and readily assessed through school records and adolescents' self-reports (Reschly & Christenson, 2012;

Skinner & Pitzer, 2012). Finally, when researchers utilize terms such as engagement, a precise focus aids in the design and implementation of school improvement measures as well in the advancement of theoretical understanding (Eccles & Wang, 2012). In light of these considerations, I apply a working definition of student engagement emphasizing behavior toward studying relations between adolescents' perceptions of schools' social contexts, self-concept of ability beliefs, and engagement. This chapter supports the research in (a) discussing the significance of student engagement in educational settings; (b) describing the theoretical framework informing the research; (c) summarizing the literature on adolescents' engagement with schooling emphasizing apposite contextual, psychological, and individual influences; and (d) outlining the questions and hypotheses guiding the research.

Student Engagement as a Vital Goal of Schooling

Increasing adolescents' engagement with schooling represents a vital goal for educational policymakers and practitioners of teaching and learning. Student engagement promotes positive development and acts as a buffer against risky behavior and delinquency (Finn & Owings, 2006; Morrison, Robertson, & Laurie, 2002; National Research Council & Institute of Medicine, 2004). Higher levels of engagement are associated with reduced truancy, disruptive behaviors, and violations of school rules, all of which result in disciplinary suspension (Connell, Halpern-Felsher, Clifford, Crichlow, & Usinger, 1995; Connell, Spencer, & Aber, 1994). Students who are more engaged with schooling earn higher grades and are less likely to drop out of high school before graduation (Alexander, Entwisle, & Kabbini, 2001; Janosz, Archambault, Morizot, & Pagani, 2008). A review of longitudinal studies characterizes student engagement as one of the most effective predictors of staying in school versus dropping out (Rumberger & Lim, 2008).

As key behavioral indicators of school engagement, attendance and conduct predict achievement-related outcomes. In a study of adolescents attending elementary, middle, and high schools across one Midwestern state, Roby (2004) identified attendance as one of the most effective predictors of academic performance. In urban high schools, absenteeism has been shown to be negatively correlated with grades (Steward, Steward, Blair, Hanik, & Hill, 2008). Poor attendance predicts the failure to graduate on time or one year late: One study found that sixth graders with an 80% attendance rate had only a 1 in 6 chance of graduating from high school (Balfanz et al., 2007). In addition to showing up for school, student conduct conforming or conflicting with school and/or classroom rules and/or policies is also linked to performance-related outcomes. For example, Wentzel (1993) found a significant association between noncompliance with school and/or classroom rules, course grades, and standardized test scores. A study of African American adolescents attending rural schools in the South found a clear association between behavioral adjustment and academic achievement measured by end-of-year grades (Farmer, Irvin, & Thompson, 2006). Similarly, Eccles and Wang (2012) demonstrated that adolescents who exhibited less disruptive and/or more compliant behaviors at school were more likely to succeed academically.

A bird's eye view of the literature suggests ample empirical support for the assertion that school engagement plays an important role in shaping favorable educational outcomes including achievement and persistence (Finn & Zimmer, 2012). Whereas the studies noted above link engagement with immediate educational outcomes (e.g., grades and behavioral compliance), the developmental influence of school engagement appears to extend beyond the elementary and secondary school years. Longitudinal studies document long term relations to mental health outcomes and life satisfaction (Creed et al., 2003), socioeconomic

standing (Sum et al., 2009), and involvement in criminal activity, including the risk of serving time in prison (Fine et al., 2001; Li & Learner, 2011). Student engagement predicts school-related outcomes and developmental trajectories characterizing life satisfaction, well-being, and future attainment. Therefore, it is prudent to advance insight into the ways school contexts can support or undermine engagement.

Establishing meaning and import represent precursory steps toward the goal of furthering insight into the development of adolescents' school engagement. At this juncture, theory is essential to outlining a precise model linking contextual factors with student engagement. Several theoretical perspectives support the current research examining linkages among the social environment at school and motivation related outcomes (e.g., Bandura, 1986; Comer, 2010; Eccles & Midgley, 1989; Ryan & Deci, 2000). This study draws guidance from the Self-Systems Model of Motivational Development (SSMMD) (Connell, 1990; Connell & Wellborn, 1991; Deci & Ryan, 1985; Skinner & Wellborn, 1994). The following section discusses this theoretical framework and its application to the current study.

Student Engagement within a Self-Systems Framework

Research on achievement motivation increasingly characterizes student engagement as developing within a framework of personal and environmental influences (Fredricks, Blumenfeld, & Paris, 2004, Reschly & Christenson, 2012). Aptly, the SSMMD attends to the contributions of perceived social practices or norms and to psychological processes (i.e., self-appraisals) in shaping student engagement. As the self-systems framework has been utilized effectively to investigate the development of engagement as an outward manifestation of motivation influenced by interpersonal and intrapersonal processes (Connell

& Wellborn, 1991; Deci & Ryan, 1985; Grolnick & Ryan, 1989; Skinner & Belmont, 1993; Skinner et al., 2008), it offers sound theoretical support for the hypothesized model (see Figure 2).

An underlying premise of the SSMMD is that humans are naturally curious and aspire to master the knowledge and skills characterizing successful participation in social life (Deci & Ryan, 1985; Niemiec & Ryan, 2009). Basic psychological needs for competence, autonomy, and relatedness provide the motivational basis for engagement, mastery, and learning. Competence refers to a person's "desire to feel efficacious, to have an effect on one's environment, and to be able to attain valued outcomes" (Deci, 1998, p. 152). Autonomy relates to perceptions of personal control, signifying the possibility of exercising volition in individual or collective engagement (Ryan & Deci, 2000, p. 74), whereas relatedness refers broadly to a person's feelings or perceptions that they are securely and satisfyingly connected to others in the group or community (Connell & Wellborn, 1991, p. 51; Deci, Vallerand, Pelletier, & Ryan, 1991, p. 327).

Although psychological needs represent individually situated factors influencing engagement, it is the social context that structures, provides, or fails to provide opportunities and experiences informing self-appraisals of competence, autonomy, and relatedness. From a theoretical standpoint, when a school's social environment provides opportunities and/or supports to assist students in meeting their basic needs, students will engage in the activities and behaviors characterizing positive school participation. On the other hand, if a school's social context undermines opportunities for students to meet their needs for competence, autonomy, and relatedness, they are more likely to become disengaged or withdraw from activities or behaviors characterizing positive school participation. Succinctly stated, the

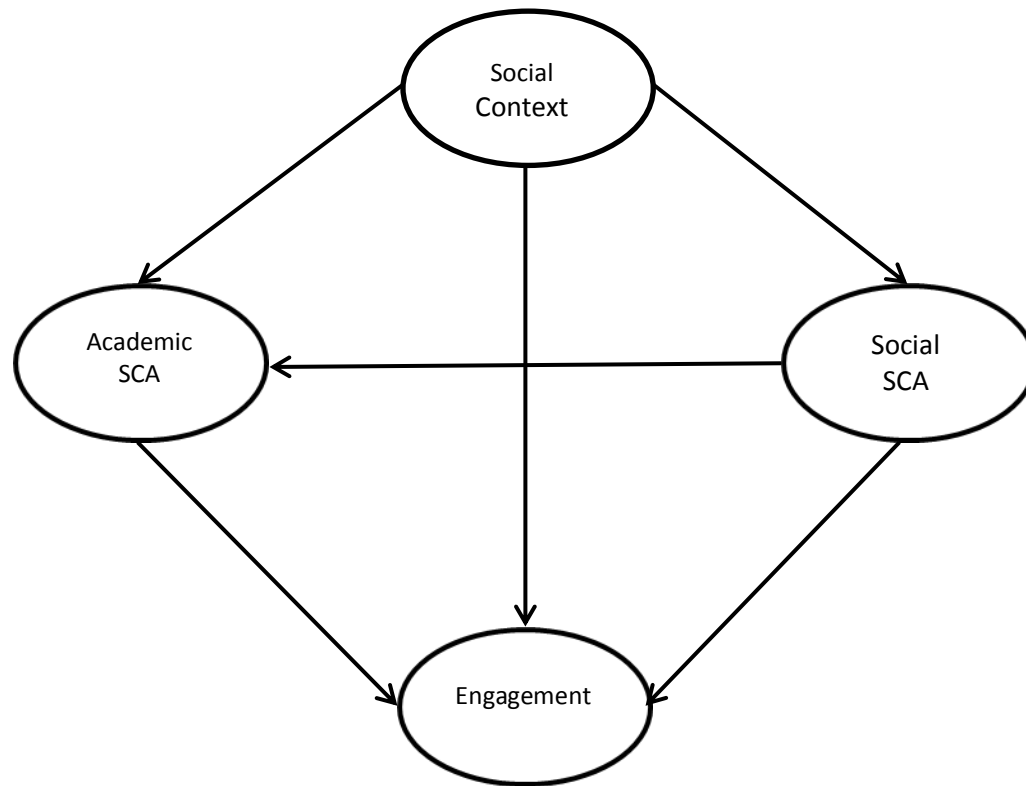


Figure 2. Basic structural model.

school's social context influences engagement through shaping students' self-appraisals of competence, autonomy, and relatedness. The following section defines the social context of schooling as it is utilized within this dissertation study, and summarizes empirical evidence linking this context to student engagement.

Social Context and Student Engagement

As a psychological model of motivation, the SSMMD emphasizes the importance of students' perceptions of the environment rather than objective features such as size, physical structures, or grade configuration. In applying this model to the study of student engagement, Skinner and colleagues (2009) identified perceptions of social support and perceptions of "higher-order properties such as school climate" (p. 233) as critical dimensions of school contexts that influence student development. As such, the current investigation focuses specifically on climate and support as interpersonal dimensions of the school's social context contributing to student engagement. Although studies demonstrate that students' perceptions of these dimensions of the social context of schooling contribute to motivation (Juvonen, 2006; Skinner et al., 2009; Wentzel & Wigfield, 2007), extant literature has not sufficiently explained relations between school-based social contexts and the development of student engagement (Janosz, 2012). Additionally, focusing on support and climate as distinct and malleable features of the schools' social contexts can provide targeted information to guide educational reform efforts geared toward supporting student engagement.

Social Support and Student Engagement

Research on social support emphasizes associations between perceptions or experiences of support and outcomes indicative of physical or mental well-being. Educational and psychological studies have focused on illuminating the developmental

contributions of types and sources of social support to performance-related outcomes (i.e., Patrick et al., 2007; Wentzel et al., 2010; Zimmer-Gembeck, Chipuer, Hanisch, Creed, & McGregor, 2006). The current study draws on these works in emphasizing the contributions of instrumental and emotional support (types) provided by teachers and peers (sources) to the development of student engagement. Instrumental support refers to provisions of resources or assistance geared towards helping individuals accomplish academic tasks or goals valued by the school community. This type of support implies sharing information, advice, or experiences, and it includes actions such as studying together or providing additional instruction when needed (Wentzel et al., 2010). Whereas instrumental support is geared toward assisting individuals in meeting specific tasks and/or academic goals, emotional support aids the individual in feeling secure, accepted, cared for, comforted, liked, or respected within the school community (Wentzel et al., 2010).

Teachers and peers represent immediate social partners in school contexts; therefore, perceptions of support from both represent potential sources of developmental influence. In response, studies selected for inclusion in this literature review conceptualize and measure social support based largely on students' perceptions regarding the availability and/or provisions of instrumental and/or emotional support from teachers and peers. In keeping with the goal of the current project, these studies link perceptions of social support with indicators of adolescents' behavioral engagement with schooling (i.e., effort, attendance, and adherence to school or classroom policies, rules, or norms).

Teacher support. Pianta, Hamre, and Allen (2012) provided keen insight into the nature of the relationship between teacher support and student engagement:

Students' relationships and interactions with teachers either produce or inhibit

developmental change to the extent that they engage, meaningfully challenge, and provide social and relational supports. In this sense, relationships between teachers and students reflect a classroom's capacity to promote development, and it is precisely in this way that relationships and interactions are the key to understanding engagement. (p. 366)

A number of studies have illuminated associations between teacher-based social support and markers of adolescents' school engagement. One qualitative study employed student ratings to identify teachers who created classroom contexts supportive of motivation and engagement (Anderman, Andrzejewski, & Allen, 2011). In analyzing field notes based on extensive classroom observations, three distinct themes emerged. Of the three core themes, two reflected the importance of teacher support. The first, *supporting understanding*, was characterized as providing instrumental or academic support while the second theme, *building and maintaining rapport*, reflected teachers' provisions of emotional support. These findings demonstrate a view of teacher-based social support inclusive of instrumental and emotional components and illuminate the significant contributions of students' perceptions of teacher support toward the development of academic engagement.

Quantitative studies shed additional light on teacher support and engagement. Students who perceive higher levels of teacher support concurrently report higher levels of engagement whereas perceptions of low levels of teacher support predict student disengagement in the form of reduced effort, attention, preparation, and attendance (Klem & Connell, 2004). In this study, students who perceived high levels of support were nearly three times more likely to report higher levels of school engagement. Other studies illustrate longitudinal relations between teacher support and student engagement. Wentzel (1997)

investigated the influence of social support from teachers, defined through perceptions of care. Adolescents' perceptions of teachers support predicted academic effort, efforts to help others, and intentions to comply with classroom rules and/or behavioral norms. The effects of teacher support in the sixth grade continued to contribute to behavioral outcomes and effort across the middle school years. More recently, Wang and Holcombe (2010) demonstrated the extent to which adolescents perceived teachers as offering emotional support in the seventh grade, predicted participation or behavioral engagement (i.e. attention, effort) one year later. The association between teacher support and behavioral engagement does not appear to be limited to school settings within the United States. In a rural Canadian sample, perceived teacher support was significantly and negatively correlated with problem behaviors at school (Duschesne & Larose, 2007). Likewise, in a study of Turkish and Moroccan immigrants living in Belgium, teacher support was associated with fewer instances of school misconduct (Demanet & Van Houtte, 2012).

As a group, these studies emphasize the significance of teacher support on adolescents' behavioral engagement with schooling and substantiate the claim that provisions of instrumental and emotional support from teachers represent a palpable influence on students' academic experiences. Although there is little doubt that teacher support signifies a critical dimension of the school environment influencing engagement, the role of peer influence is less clear. Whereas some studies minimize the import of peer support, others report significant relations between peer-based provisions of social support and student engagement.

Peer support. Studies reporting a lack of evidence linking adolescents' perceptions of peer support and behavioral engagement with schooling (e.g., Lam et al., 2012) are

perplexing because peer relationships are acknowledged as significant developmental contexts characterizing the daily experiences of adolescence (Brown & Larson, 2009; Hamm & Zhang, 2010). The effects of participation in peer contexts reach far beyond the boundaries of friendships, cliques, or crowds in shaping behavior, thoughts, and feelings across multiple ecological contexts (Gifford-Smith & Brownell, 2003) including schools and classrooms. Highlighting the influence of peer support on student engagement, the studies presented in this section align with the concept of teacher-based social support in attending to the provisions or resources (i.e., emotional or instrumental) made available through participation in friendships and/or peer groups.

Hamm and Faircloth (2005) utilized qualitative methods to identify aspects of friendship contributing to perceptions of school belonging linked to school engagement (Anderman, 2002; Goodenow, 1993; Sanchez, Colon, & Esparza, 2005). Through provisions of loyalty and support, friendships helped students navigate academic and personal difficulties within the school setting. Intimacy experienced within close relationships resulted in the ability of friends to personalize or match the support they provided to participants' individual needs. Through the sharing of common values and interests, participants experienced acceptance and affirmation within friendships. Finally, the companionship afforded through friendships, and the pleasure or enjoyment of being together, played a central role in helping students maintain positive outlooks when classroom instruction proved to be less than engaging. While the study focused on the development of sense of belonging, all of the themes emerging from the data portray adolescents' friendships as sources of instrumental and/or emotional support contributing to student engagement.

Also focused on the provisions of friendship, a second study utilizing a nationally

representative sample of middle school students (Li, Lynch, Kalvin, Liu, & Lerner, 2011) found perceived emotional support from peers in the sixth grade predicted behavioral engagement concurrently and continued to predict engagement across the middle school years. Other studies offer comparable findings. For example, Berndt and Keefe (1995) reported that students who rated their friendships more positively in terms of offerings of help, encouragement, recognition, praise and opportunities for intimate self-disclosure tended to be more positively engaged in schooling. Wentzel and colleagues identify associations between perceptions of peer support and adolescents' academic effort and adherence to classroom/school rules and policies (Wentzel, 1994; Wentzel & Caldwell, 1997). Wentzel, Barry, and Caldwell (2004) identified significant differences in behavioral outcomes between students with and without reciprocated best friendships. Having a friend who was willing to share, cooperate, and offer help predicted increases in an individual's own prosocial and socially responsible behaviors over time. Likewise, Nelson and DeBacker (2008) found that the quality of the relationship with one's best friend conceptualized in measures of perceived help, intimacy, and security accounted for significant variance in goals reflecting the desire to engage in classroom tasks and activities because of the opportunities they provide to form or sustain friendships.

Van Ryzin (2011) found that teacher and peer support showed significant associations with student engagement. However, only peer support predicted behavioral indicators of engagement with learning one year later. This study, along with an early work by Skinner and Belmont (1993) is unique in that it looked at reciprocal effects and found support for the premise that adolescents' who are more engaged in schooling elicit greater support from teachers and peers. Wang and Eccles (2012b) found that teachers represented a stronger

influence on emotional and cognitive engagement. In contrast, peers exerted more influence on behavioral engagement. These findings support the premise that different sources of support contribute uniquely to the development of student engagement. The literature cited on social support implies that school engagement is influenced by adolescents' perceptions of the support provided by teachers and peers. Additional studies support the proposed model linking social with academic processes in emphasizing the contributions of broader perceptions of school climate. These studies are the focus of the following section.

School Climate and Student Engagement

Positive school climate has been linked to achievement-related outcomes and increases in student engagement (e.g., Anderman, 2002; Battistich, Solomon, & Watson, 1997; Benner, Graham, & Mistry, 2008; Eccles & Roeser, 2011; Lee & Burkam, 2003; Marks, 2000). Measures of school climate reflect constituents' perceptions of "the values, norms, beliefs, and sentiments associated with routine practices and social interaction in schools" (National Research Council & Institute of Medicine, 2004, p. 97). Building on teacher and peer support literatures, this review focuses on studies that illuminate the significance of social interactions or interpersonal features that characterize school climate. Therefore, for the purpose of this study, school climate is defined in terms of students' aggregated or generalized perceptions of the school community in regards to emotional warmth and a shared sense of school attachment (i.e., care, encouragement, inclusiveness). Scholars examining school-based social contexts, motivation, and engagement (e.g., Juvonen, 2006; Osterman, 2000; Wentzel, 1997) identify emotional warmth and sense of belonging as significant factors that characterize students' perceptions of school climate. Whereas some research focuses on climate at the classroom level, adolescents move between

classes, encounter a larger and more diverse peer group, and work with teachers with different expectations, rules, and instructional practices justifying this study's measure of climate that reflects students' experiences across the day (Brand et al., 2003). In light of these considerations, the following sections summarize studies of perceptions of school climate that emphasize warmth and sense of school belonging.

Emotional warmth. Different terminologies have been employed in characterizing school climate reflecting emotional warmth including *caring* or an *ethic of care* (Bryk & Driscoll, 1988; Noddings, 1984; Wentzel, 1997), *communal structuring* (Lee & Smith, 2001), and *cohesion* (Loukas & Murphy, 2007). Whereas these constructs measure distinctive aspects of the school's interpersonal environment, they coalesce in stressing the importance of students' perceptions of school climate as caring, emotionally warm or friendly, and limited in terms of expressions of social hostility and/or interpersonal friction. Juvonen (2007) identified a caring culture as one of the most critical dimensions of school climate supporting the possibility of school reform to enhance student engagement. In a multinational study, Juvonen found U.S. youth perceived school environments as significantly less caring, friendly, and accepting than adolescents who attended schools in other North American and European countries. This is troubling in light of empirical evidence supporting a link between a caring school climate and adolescents' school engagement. For example, Bryk and Driscoll (1988) investigated school climate employing data from the High School and Beyond study. They found higher rates of attendance and achievement associated with students' perceptions of a social climate defined by positive caring relationships. Likewise, Lee and Burkam (2003) found associations between student engagement (i.e., attendance and persistence) and adolescents' perceptions of teachers as

caring and responsive.

Additional studies point to associations between a caring school climate and an array of behavioral indicators of student engagement including adherence to school or classroom rules, attentiveness, and effort. Way, Reddy, and Rhodes (2007) reported a decrease in students' perceptions of a positive school climate over the middle school years coinciding with a significant increase in patterns of behavior (skipping class or school, breaking school rules, etc.) indicative of declines in behavioral engagement. Data analyses tested for bidirectional influences, and the results supported a unidirectional model in which a supportive climate contributed to behavior. Wang and Dishion (2012) also found students' perceptions of school climate deteriorating over the middle school years with this decline predicting increases in teacher reports of conduct (failure to cooperate, misbehavior to get out of schoolwork, fighting) indicative of a lack of behavioral engagement. Wang, Selman, Dishion, and Stormshak (2010) found a significant positive correlation between school climate characterized by caring interactions and student reports of conduct reflecting behavioral engagement (e.g., attendance, following directions). Loukas and Murphy (2007) found that school environments rated by students as high in friction (i.e., hostility, frequency of conflict, lack of warmth) were associated with increased behavioral problems (e.g., failure to follow directions, lack of self-control, fighting). In contrast, students' perceptions of schools as high in cohesion, characterized by a warm and/or positive relational context, appeared to buffer against disciplinary problems and offset increases in school disengagement particularly for those individuals who had difficulties focusing and following through on academic tasks or assignments. Utilizing a nationally representative sample of adolescents, You and Sharkey (2009) found school-level variables (e.g., socioeconomic

status (SES), student-teacher ratio, teacher expectations, teacher support, and school safety explained approximately one third of the variance in initial levels of student-reported behavioral engagement (e.g., preparedness for class, completion of assignments) and approximately one third of the variance in growth trajectories of engagement over time. After accounting for student-level influences, the school-level variable that had the largest effect on adolescents' engagement was teacher support.

This group of studies conceptualized school climate focusing on generalized perceptions of emotional warmth. Additional studies provide insight into the influence of *sense of belonging* as a dimension of school climate defining the social context of schooling and contributing to adolescents' engagement with schooling.

Sense of belonging. Baumeister and Leary (1995) identify the need to belong as a basic human desire that is linked to cognitive processes, behavioral responses, emotional health, and physical well-being. Although many studies focus on sense of belonging at the individual level (e.g., Farmer, & Hutchins, 2011; Goodenow, 1993; Hamm & Faircloth, 2005b; Irvin, Meece, Byun, Roeser, Midgley, & Urdan, 1996), the current research attends to the influence of perceptions school-wide sense of belonging. Two studies have investigated the role of school-wide belonging in regards to adolescents' school engagement. Benner, Graham, and Mistry (2008) measured school climate employing aggregated measures of sense of belonging, fairness, and interracial climate to predict engagement in a racially diverse sample of ninth grade youth attending high schools throughout the greater Los Angeles metropolitan area. Perceptions of belonging made significant contributions to adolescent and teacher reports of student engagement including behavioral markers of attention and effort. Anderman (2002) employed data from the National Longitudinal Study

of Adolescent Health to compare the impact of individual and generalized perceptions of school belonging on the development of school problems indicative of a lack of student engagement. School problems, including difficulties with attention, task completion, and social functioning were negatively related to individual and generalized perceptions of belonging. Notably, in some instances generalized perceptions of belonging were positively correlated with behaviors indicative of a lack of school engagement.

Findings from these studies highlighting emotional warmth and a shared sense of belonging as features of school climate are consistent with the research on peer and teacher support in demonstrating links between adolescents' perceptions of school-based social relationships and behaviors indicative of school engagement.

Summary of Research on Schools' Social Contexts and Student Engagement

The studies discussed in the previous sections point to the influences of teacher and peer-based support and interpersonal aspects of school climate on adolescents' school engagement. Research on social support, school-level emotional warmth, and shared sense of belonging informed my decision to focus on support and climate as integral components of the social context of schools influencing student engagement. Although evidence linking social support and school-climate with student engagement has been generated, important questions remain. Limited studies linking generalized perceptions of belonging and adolescents' school engagement suggest the need for additional research. Furthermore, insight into the processes by which interpersonal contexts influence student engagement remains lacking.

In drawing on the SSMMD the current study recognizes the possibility that students come to define or understand themselves as learners through ongoing interactions with social

partners (Danielson, Samdal, Hetland, & Wold, 2009; Marchand & Skinner, 2007; Patrick et al., 2007). Hence, in addition to social factors, views of the self are proposed to exert significant influence on academic functioning (e.g., Bandura, 1986; Connell & Wellborn, 1991; Meece, Wigfield, & Eccles, 1990; Skinner & Wellborn, 1994). In alignment with the SSMMD, the model evaluated here identifies self-concept of ability (a proxy for competence beliefs) as a key psychological process mediating the influence of social context on student engagement. Support for this premise is discussed next.

Competence Beliefs as Mediators

A critical assumption of the SSMMD is that students' subjective perceptions of the school context shape self-systems (i.e., psychological factors) influencing student engagement (Connell & Wellborn, 1991; Skinner et al., 2009). The SSMMD identifies students' self-appraisals of competence, autonomy, and relatedness as key psychological mechanisms mediating relations between perceptions of the school's contexts and engagement. While all three constructs contribute significantly to development across adolescence (Arnett, 2000; Wigfield et al., 2006), this study emphasizes the influences of academic and social competence beliefs or more specifically academic and social self-concept of ability beliefs. Broadly speaking, competence beliefs represent "the individual's perception of his or her current competence at a given activity" (Wigfield & Eccles, 2000, p. 70). As such, academic competence beliefs or academic self-concept of ability beliefs represent measures of students' perceptions of current ability in specified academic contexts, whereas social competence beliefs or social self-concept of ability beliefs reference perceptions of current ability in social situations.

Elliot and Dweck (2005) emphasize competence as central to understanding

achievement motivation as the need for competence energizes and directs behavior, influences affect, and impacts development regardless of age or cultural membership. Various motivational perspectives (e.g., expectancy-value, self-efficacy, self-determination theories) reflect the assumption that persons who believe they are competent in a specific setting and/or domain are more likely to demonstrate behaviors indicative of engagement and make greater achievement gains within that setting and/or domain (e.g., Bandura, 1986; Connell & Wellborn, 1991; Deci & Ryan, 1985; Eccles, Adler, & Meece, 1984).

Reflecting a self-systems perspective, the model evaluated in the current research defines self-concept of ability beliefs as mediators, or process variables (Kenny, 2011), explaining the relations between students' perceptions of the school's social context and their behavioral engagement with schooling (see Figure 2). The proposed model hypothesizes direct effects between social context and student engagement. However, it is the possibility of indirect or mediated effects working through academic and social self-concept of ability beliefs that is of particular interest as mediation offers an explanation for the relationship between predictor and outcome variables (Baron & Kenny, 1986; Frazier, Tix, & Barron, 2004). As mentioned previously, understanding the mechanisms by which interpersonal contexts influence student engagement remains an important task for educational research. As such, the following sections focus on evidence linking relevant aspects of schools' interpersonal contexts and student engagement through the mediating effects of self-concept of ability beliefs or students' perceptions of academic and social competence.

Academic Competence Beliefs

Some studies have provided evidence of the mediating role of beliefs that characterize self-perceptions of academic competence in circumscribing relations between the social

context of schools and student engagement. First, research on stage-environment fit supports the premise that competence beliefs mediate the association between social contexts and adolescents' behavioral engagement with schooling. Eccles and colleagues (Eccles & Midgley, 1989; Feldlaufer, Midgley, & Eccles, 1988; Eccles, Midgley, & Adler, 1984) reported declines in indicators of student engagement, as assessed by self-report measures, following the transition from elementary school to middle school. Evidence suggested these declines were linked to key changes in the interpersonal context of schools as children transition from elementary school to middle school environments. More specifically, Eccles and colleagues posit that declines in engagement relate to larger peer groups and increasingly impersonal teacher-student interactions potentially undermining competence beliefs that in turn influence student engagement. Thus, research employing a stage-environment fit perspective emphasizes the key role of teacher and peer support in shaping adolescents' perceptions of competence, which in turn predict levels of school engagement (National Research Council and Institute of Medicine, 2004).

Recent studies of achievement motivation support research on stage-environment fit emphasizing connections between school-based interpersonal contexts, students' perceptions of academic competence, and engagement with schooling. Diseth, Danielsen, and Samdal (2012) found students' perceptions of teachers' support for relatedness, a proxy for emotional support, and support for competence, a proxy for instrumental or academic support, predicted academic self-efficacy which in turn predicted engagement-related outcomes. Analogously, Sakiz, Pape, and Hoy (2012) found that students who perceived greater amounts of emotional support from teachers reported stronger competence-related beliefs, which predicted engagement in the form of academic effort. Chouinard, Karsenti, and Roy (2007) also

reported that perceived teacher support significantly contributed to adolescents' competence beliefs which in turn predicted engagement (i.e., effort). In contrast, Danielsen, Breivik, and Wold (2011) found that teacher and peer support directly contributed to academic initiative reflecting student engagement. Teacher support also predicted engagement indirectly by contributing to adolescents' perceptions of academic competence. However, peer support was not significantly related to self-perceptions of academic competence. In contrast, Ahmed, Minnaert, van der Werf, and Kuyper (2010) reported that perceptions of support from teachers and peers influenced performance outcomes directly and indirectly through the effects of competence beliefs. In this sample of Dutch adolescents, teacher support held the strongest associations with competence.

Although the previously noted works provide varying levels of support for the premise that competence beliefs mediate the association between social support and behavioral engagement, these predicted relations were not found in at least one study. In a sample of primarily Latino middle school students from economically disadvantaged households and identified as at elevated risk for school failure, Bouchev and Harter (2005) found that perceived support from teachers and classmates directly predicted engagement in science and mathematics classrooms. Notably, analyses did not support the mediation hypothesis in that social support was not significantly related to adolescents' perceptions of academic competence.

While a number of studies have evaluated the mediating role of academic competence beliefs between social support and student engagement, only one study examined associations between school-level climate as conceptualized in the current context, competence beliefs, and performance measures reflecting adolescents' school engagement.

Marchant, Paulson, and Rothlisberg (2001) reported students' perceptions of school climate (i.e., a responsive and supportive social environment) influenced performance through competence beliefs. Additionally, the authors found evidence to suggest that school climate exerted a unique influence on competence beliefs above and beyond the contributions of teacher support.

Studies investigating the role of competence beliefs in defining relations between adolescents' perceptions of the social context of schooling and behavioral indicators of student engagement provide reasonable support for a mediational hypothesis. Research demonstrates that the influence of the school's social context on student engagement can be partially explained by the influence of support and climate on students' academic competence beliefs. While most studies cited reported evidence of mediation, conflicting findings suggest the continued need for studies examining the roles of cultural factors in explaining how interpersonal contexts shape student engagement. Although school climate has been cited as a vector of the social context of schools that impacts student development (Skinner et al., 2009), little scholarship has investigated the possibility that academic competence beliefs mediate the association between climate and engagement. Attending to climate as a critical dimension of social context highlights a largely overlooked avenue by which school contexts potentially influence student engagement. Recognizing the significance of students' perceptions of school climate may provide new insights to draw on in planning school intervention and reform efforts emphasizing group and/or community dynamics. Increasing evidence supports the premise that academic competence beliefs mediate the influence of school-based social contexts on student engagement. However, almost no empirical work has investigated the same relations in terms of social competence

beliefs. Relations between the social context of schools and adolescents' school engagement mediated by social competence beliefs represent the focus of the following section.

Social Competence Beliefs

As schools represent academic and social arenas, an equally important consideration is that social self-concept of ability or social competence beliefs, along with academic self-concept of ability or academic competence beliefs, may mediate the relation between adolescents' perceptions of the school's social context and student engagement. Research indicates an association between social competence and academic engagement (e.g., Nelson & DeBacker, 2008; Wentzel, Filisetti, & Looney, 2007). However, only two studies were identified as evaluating hypotheses which suggest that social competence beliefs mediate the influence of a school's social context on student engagement.

Patrick, Ryan, and Kaplan (2007) tested a model in which teacher and peer support contributed to academic and social competence beliefs, which in turn influenced task-related interactions indicative of behavioral engagement. Adolescents' perceptions of support from teachers exerted direct and indirect influence on behavioral indicators of engagement through academic competence beliefs. Peer support contributed directly to engagement and influenced engagement indirectly through shaping students' self-perceptions of academic and social competence beliefs. While the previous study supports social competence beliefs mediating the influence of peer-based social support on engagement, Wang (2009) found corresponding evidence of mediation in terms of school climate. Students who perceived a more positive school climate in seventh grade were more likely to report enhanced perceptions of social competence which predicted behavioral and psychological outcomes one year later.

The limited literature exploring associations between school-based interpersonal contexts, social competence beliefs, and school engagement represents both a challenge and an opportunity. The two studies cited and studies reporting associations between perceptions of school-based social support, social competence, and behavioral outcomes form the basis for positing a mediating role for social competence or social self-concept of ability beliefs. Predictions regarding the significance of this pathway in the proposed model are made with caution. In light of the gap in the literature, further study of indirect effects in regard to students' social self-concept of ability beliefs is warranted. Although limited, existing evidence suggests that like academic self-concept of ability beliefs, social self-concept of ability beliefs may also be a process by which the social context of the school, as perceived by adolescents, influences measures of school engagement. To date, social processes have largely been considered in terms of influence on social development (Juvonen, 2006). Modeling associations between adolescents' perceptions of the school's social context and academic outcomes, more specifically, the contributions of social self-concept of ability beliefs to academic self-concept of ability beliefs and behavioral engagement, stresses the important but neglected association between social and academic development.

The literature reviewed here has emphasized the roles of social and psychological contexts as core tenets of a self-systems view of motivation. While social support, school climate, and self-concept of ability beliefs undoubtedly contribute to student engagement, we cannot overlook the developmental impact of individual characteristics such as gender and race. In response, the current work examines the possibility that gender and race act as moderators that shape the nature of relations between adolescents' perceptions of the social context of schooling, self-concept of ability beliefs, and engagement.

Gender and Race as Moderators

Demographic trends and patterns of school achievement reflecting racial and/or gender differences (Bingham & Okagaki, 2012; Meece & Askew, 2011) warrant ongoing attention to the role of these factors in shaping the development and expression of student engagement. Research supports the premise that differences in students' perceptions of the social context of schooling and variance in academic motivation and engagement, can be attributed in part to individual-level characteristics such as gender and race (e.g., Dotterer, Mchale, & Crouter, 2009; Fan, Williams, & Corkin, 2011; Koth, Bradshaw, & Leaf, 2008; Shernoff & Schmidt, 2008; Smalls & Cooper, 2012; Wang & Eccles, 2012b). Whereas a body of literature suggests that student perceptions of the school environment and levels of engagement may differ by gender and race, the interest here is in testing for *moderation* or the possibility that the structural relations within the proposed model vary in accordance with group membership. Stated differently, the question of interest is "Does the proposed model operate similarly across groups defined by gender and race?" According to the model evaluated in the current study, moderation would be supported if social support and/or school climate had a different impact on the student engagement of boys versus girls, or on African American versus White adolescents.

Gender, the Social Context of Schools, and Student Engagement

A number of studies report findings suggesting girls perceive higher levels of social support from teachers and peers (e.g., Azmitia & Cooper, 2001; Green, Rhodes, Hirsch, Suárez-Orozco, & Camic, 2008; Marks, 2000; Way et al., 2007; Wentzel et al., 2010). Findings are more ambiguous in terms of gender and the impact of social support on adolescents' school engagement. Goodenow's work focusing on adolescents' perceptions of

belonging in urban school settings suggests a more influential role of school contexts, measured in part by teacher support, on girl's motivation and engagement with schooling (Goodenow, 1993; Goodenow & Grady, 1993). In reference to behavioral engagement, teacher support appeared to exert a stronger influence on the effort that girls showed toward meeting academic demands within the classroom setting. Crosnoe, Johnson, and Elder (2004) investigated associations between teacher-student relationships, behavioral problems implying a lack of student engagement, and achievement. In a nationally representative sample of adolescents, two significant gender effects were identified. Whereas close teacher-student bonds were associated with the behavior of all students, this link was stronger in relation to the achievement and behavior of Hispanic and White girls, respectively. These findings are in line with earlier research on gender and motivation emphasizing the relational nature of women's development (Belenky, Clinchy, Goldberger, & Tarule, 1986; Gilligan, 1982).

More recent studies, however, reveal evidence that suggest relations with teachers and peers may play a more salient role in shaping the school engagement of boys. For example, Furrer and Skinner (2003) investigated the influence of gender on the relation between students' perceptions of relatedness and school engagement. The sample was 95% Caucasian and was drawn from schools serving communities characterized as suburban-rural. In general, students who perceived closer relationships with their parents, teachers, and peers reported higher levels of behavioral engagement with schooling. However, significant gender differences emerged. Whereas girls' perceptions indicated stronger feelings of relatedness toward teachers and peers, relatedness to teachers had a stronger impact on the behavioral engagement of boys.

After decades of post-Title IX research, policy, and pedagogical efforts aimed at mitigating barriers to girls' participation and achievement in schools and classrooms, girls appear to have made significant gains. Trends suggest that girls are earning higher grades at school, achieving higher class rankings, being awarded more academic honors, and graduating from high school and college at a higher rate than their male counterparts (Meece & Askew, 2011). As girls begin to outperform boys in a number of educational arenas, once again questions come up regarding gender and educational equity. Popular titles such as *The War Against Boys* (Sommers, 2000) and *Boys and Girls Learn Differently* (Gurian, 2001) point to higher instances of school suspension and expulsion, dropout, and special educational placement as evidence of an educational system that penalizes boys for their "nature" and in doing so systematically fails to meet the needs of male students. Scholarly literature also reflects renewed interest in gender and education in asking questions regarding whether and in what ways school environments may contribute to the trend of increasing disengagement and academic underperformance of boys (for reviews see Frank, Kehler, Lovell, & Davison, 2003; Meece & Askew, 2011).

While the ideas presented above can potentially refocus educational dialogue on the importance of interpersonal or social contexts to adolescent boys' school engagement, little consensus exists about the role gender plays in shaping relations between participation in school-based relationships and student engagement. Some studies have identified the support and encouragement gained from relational contexts as more important to the engagement of girls. Other studies have suggested it may make a larger impact on the school engagement of boys, while still other studies have reported no evidence that gender plays a significant role in shaping the associations between social participation and engagement (e.g., Li et al., 2011;

Skinner et al., 2008; Wang & Eccles, 2012; Wang et al., 2010). While findings focusing on gender and student engagement are complex and represent different theoretical stances (Weaver-Hightower, 2003), one message emerges clearly. Gender is an important dimension, but is only one aspect of students' multifaceted social identities contributing to academic motivation, engagement, and achievement. In addition to gender, race continues to be widely recognized as an influential characteristic that shapes relations between school-based social context and engagement.

Race, the Social Context of Schools, and Student Engagement

Whereas the role of race in schooling has been studied from a number of perspectives, in keeping with the focus of the current study, the review presented here focuses specifically on studies exploring racial group membership in terms of potentially moderating influences on associations between adolescents' perceptions of the interpersonal context of schooling, of competence beliefs, and of student engagement. The heightened probability of poor school adjustment, which is reflected by lagging academic performance and elevated dropout rates among African Americans and other students of color (Quintana et al., 2012), defines race as an ongoing salient issue permeating educational discourse. Recent figures estimate the national graduation rate at 54% for African American youth, 56% for Hispanic youth, and 51% for American Indian youth (Editorial Projects in Education, 2010). These figures suggest an educational system markedly out of sync with the needs of minority youth. In nationally representative samples, racial disparities in student engagement are clearly evident. African American and Hispanic students report significantly lower levels of engagement with schooling in comparison to their white counterparts (e.g., Rampey, Dion, & Donahue, 2009; Yazzie-Mintz, 2007). Examining the potentially unique ways school-

based interpersonal contexts support minority students' school engagement may offer a particularly effective means for understanding and ameliorating racial differences in school engagement and achievement as social experiences are evidenced to exert notable influences on members of racial groups that share a history characterized in part by strained school performance and decreased educational attainment (Graham & Hudley, 2007; Rowley, Kurtz-Costes, & Cooper, 2010). In particular, social support has been identified as an important condition that contributes to minority adolescents' behavioral engagement with schooling (Marks, 2000; Schmackel, 2008; Tucker, Zayco, & Herman, 2002). In contrast with conflicting gender-related findings, strong evidence supports race as a moderating influence characterizing the associations between schools' social contexts and student engagement.

Two studies are particularly relevant to the present study. Both studies applied a self-systems framework to examine relations between interpersonal relatedness, self-appraisal, and school adjustment. Using a sample of sixth and seventh grade students attending a large metropolitan middle school, Kuperminc and colleagues (2004) reported that relations between students' perceptions of relatedness, competence beliefs, and outcomes indicative of engagement varied across group membership. Declines in perceptions of competence (measured globally across several domains) emerged as stronger predictors of behavioral engagement for Black and White students, whereas declining perceptions of the quality of peer relations exerted significantly more influence on the behavioral engagement of Black and Latino students. A second study examined the relation between teacher context (structure, autonomy support, involvement) and student reports of engagement (Tucker et al., 2002). The sample was comprised of African American students living in low-income households and enrolled in Grades 1-12. Although the study includes children as well as

adolescents, some of the reported findings were unique. Students' perceptions of emotional support, characterized as teacher involvement, contributed directly to a measure of students' overall engagement measured by 16 items including 9 items indicative of behavioral engagement. However, in contrast with previously cited studies (e.g., Ahmed et al., 2010; National Research Council and Institute of Medicine, 2004), no evidence supported self-perceptions of academic competence beliefs mediating the relation between perceptions of teacher support and student engagement. While these results suggest associations between support, competence beliefs, and engagement may differ for samples of African American students, additional research is needed.

Two studies working outside the self-systems framework are relevant. First, Wang and Eccles (2012b) confirmed the moderating effect of race with African American adolescents' perceptions of peer support exerting a stronger influence on school identification (utilized as an indicator of school engagement) demonstrating that peer support may protect African American students more so than European American students from characteristic declines in student engagement across the middle school and high school years. In addition, Gregory, Connell, and Fan (2011) conducted a statewide study of Virginia high schools to evaluate the Black-White gap in suspension rates. To the degree that suspensions indicate low student engagement, analyses indicated Black students were more likely to experience suspension in school contexts characterized as low in social support.

While there appears to be more consensus around evidence supporting the moderating role of race in comparison with gender, not all studies have supported the moderation hypothesis. For example, Benner, Graham, and Mistry (2008) investigated the contributions of family and school processes to school engagement and achievement. In a racially

heterogeneous sample of adolescents attending high schools in an urban area, race did not appear to moderate the association between school climate (measured by perceptions of belonging, fairness, academic support, and interracial relations) and indicators of student engagement (e.g., attention, effort). As with studies that posit gender moderation, conceptual issues and theoretical perspectives influence findings that implicate the role of race in defining the impact of adolescents' perceptions of interpersonal relations in school contexts on engagement. The current research focused on specific aspects of the social context of schooling to inform educational reform efforts to support student engagement. In attending to the ways in which the relations between social context and student engagement might vary across groups defined by gender and race, the current research provides insight to support the behavioral engagement of diverse learners through enhancement of well-defined features of school-based social support and climate.

Summary of Literature Review

The goal of this dissertation was to employ a self-systems motivational framework (Figure 1) to investigate the contributions of social contexts (school climate, teacher and peer support), psychological processes (academic and social self-concept of ability beliefs), and individual characteristics (gender and race) to adolescents' school engagement. The first set of studies reviewed in this chapter emphasized contextual influences linking teacher and peer-based social support and school climate with student engagement (e.g., Farmer et al., 2009; Li et al., 2011; Wang & Holcombe, 2010; You & Sharkey, 2009). The next group of studies reviewed evaluated academic and social competence beliefs as psychological processes mediating the relationship between students' perceptions of school contexts and engagement (e.g., Ahmed et al., 2010; Diseth et al., 2012; Patrick et al., 2007; Wang, 2009).

The third and final section of the literature review demonstrated limited evidence of gender and race as key individual characteristics moderating associations between social contexts and school outcomes (e.g., Elmore & Oyserman, 2012; Wang & Eccles, 2012; Gregory, et al., 2011). These studies inform the current research employing data from the first wave of MADICS to test a model of student engagement. While some evidence supports the relations hypothesized by the proposed model, the use of a racially diverse sample and methodological advances will contribute new knowledge regarding the factors and/or processes shaping important school outcomes.

Research Questions and Hypotheses

This study was guided by a number of research questions and hypotheses. These questions and hypotheses are outlined below.

Direct Effects

Research demonstrates the influence of school-based social contexts on adolescents' engagement in schooling. The following research questions and hypotheses examine this association.

1) Are students' perceptions of the social context of schooling significantly related to behavioral measures of engagement? I hypothesized that perceptions of social context would have a direct positive relation to behavioral measures of student engagement.

Based on evidence that academic and social competence are anchored by a common set of cognitive skills (i.e., self-regulation), an additional question regarding a direct effect was evaluated.

2) Are social self-concept of ability beliefs significantly related to academic self-concept of ability beliefs? Based on understanding that social relations take on enhanced

importance during adolescence, and in knowing that the purpose of schooling is largely academic, I hypothesized social self-concept of ability beliefs would have a direct positive relation to academic self-concept of ability beliefs. As there was a lack of empirical literature to draw on, this question was exploratory. Until further research on the topic is generated, all findings regarding this question should be regarded with caution.

Indirect or Mediated Effects

In addition, this study draws on a self-systems theoretical framework to evaluate the contributions of contextual influences and psychological processes to student engagement. In alignment with this perspective, the following research questions and hypotheses focus on self-concept of ability beliefs as psychological processes, in this case mediators or mechanisms, through which a school's social context contributes to the expression of behavioral engagement.

1) Do academic self-concept of ability beliefs mediate the relations of social context and student engagement? I hypothesized there would be significant indirect effects of social context on student engagement mediated by academic self-concept of ability beliefs.

2) Do social self-concept of ability beliefs mediate the relations of social context and student engagement? I hypothesized there would be significant indirect effects of social context on student engagement mediated by social self-concept of ability beliefs.

3) Do social self-concept of ability beliefs mediate the relations of social context and academic self-concept of ability beliefs? Due to the exploratory nature of this question, no specific hypothesis was made.

Moderation

Research has characterized gender and race as significant individual characteristics

that influence the nature of the relations between students' perceptions of school-based interpersonal contexts, competence beliefs, and engagement. Diverse theoretical, conceptual, and methodological approaches have produced inconsistent findings; therefore, hypotheses regarding gender and race are broadly worded.

1) Does gender moderate the structural relations in the proposed model? I

hypothesized that gender would exert a moderating influence on the structural relations in the proposed model.

2) Does race moderate the structural relations in the proposed model? I

hypothesized that race would exert a moderating influence the structural relations in the proposed model.

CHAPTER 3: METHODS

This study used secondary data collected as part of the longitudinal Maryland Adolescent Development in Context Study ([MADICS], Eccles, 1997). The de-identified data were available through the Henry A. Murray Research Archive at Harvard University. MADICS data have and continue to be employed in research to advance insight into the diverse ways multiple contexts (schools, neighborhoods, families) contribute to adolescent development. Ongoing changes have transformed social and economic circumstances that characterize the region where the original study was conducted. However, in light of the sample size inclusive of geographic, racial, and socioeconomic diversity, the data remain applicable to the study of issues that define contemporary educational contexts.

Drawing on the Self-Systems Model of Motivational Development ([SSMMD], Connell, 1990; Connell & Wellborn, 1991; Skinner & Wellborn, 1994), this study examined relations between school-based social context and adolescents' behavioral engagement with schooling. Structural equation modeling (SEM) techniques were employed to evaluate multigroup models in which students' perceptions of schools' social contexts (school climate, teacher and peer support) were hypothesized to have direct and mediated effects on student engagement (Figure 2). Academic and social self-concept of ability beliefs represented mechanisms that mediated the influence of perceptions of school-based social contexts on engagement. The study also evaluated the moderating influences of gender and race on the structural pathways in the model. This chapter provides information on adolescent participants, data collection procedures, study measures, and data preparation. Additionally,

the chapter outlines the analytic techniques employed to evaluate the research questions and hypotheses that define the study.

Participants

In the fall of 1991, all households with a child enrolled in seventh grade in a school district in the Washington, D.C. area, received information on MADICS along with a consent form that granted permission to be contacted by the research team. Of the 1,961 families that expressed interest, 1,482 families were invited to participate in the first wave of the longitudinal study. These families were chosen to reflect the demographics of the district at large and the individual junior high schools within the district. Eccles and colleagues conducted analyses to identify differences between the MADICS sample and the overall student population in the school district. In examining a range of sociodemographic and achievement variables, two significant differences emerged: Males and students receiving subsidized lunch were slightly underrepresented in the MADICS sample. The magnitudes of these differences were less than 0.1 percent of a standard deviation (*SD*).

At the start of the study, adolescent participants were in seventh grade in one of the district's 23 junior high schools. Schools were located in rural, suburban, and urban areas. All 23 schools were configured to serve seventh and eighth graders. The adolescent sample was comprised of 51% female and 49% male participants. Their mean age was 12 years 2 months. Youth resided in low income, working class, middle class, and upper-middle class households. Annual household incomes ranged from less than \$5,000 to more than \$100,000. Approximately 54% of the primary caregivers interviewed reported high school graduation as their highest level of education. An additional 40% had earned a college degree.

A subset ($n = 1,360$) of the full MADICS sample was identified for use in this dissertation study. This sample included adolescents who identified as African American or White non-Hispanic. Due to limited representation, 102 individuals claiming membership in multiracial, Latino, Asian, and other ethnic groups were not included. An additional 20 students were excluded from analyses because they were absent more than 40 days during the school year. Students who missed more than 40 days of school over the course of the academic year were defined as extreme outliers as values greater than 40 represented values more than three standard deviations away from the mean of the school absence item. Cases defined as extreme outliers were dropped based on the assumption that students who missed more than 40 days of school within a single academic year were unique and not representative of the larger sample. The final sample employed here was 51% female, 49% male, 66.7% African American, and 33.3% White non-Hispanic.

Data Collection

Data were collected during the 1991-1992 school year after adolescents had completed the transition into junior high school. The data used in this study were compiled from interviews, self-administered questionnaires, and school records. Interviews and questionnaires provided information on adolescents' perceptions of school contexts, school-related beliefs, values, and behaviors. Information on attendance and prior academic achievement (California Achievement Test scores) was obtained from school records. Whereas family beliefs, attitudes, practices, and behaviors were not the focus of the current work, information provided by primary caregivers was employed to account for the contribution of socioeconomic circumstances to student engagement.

Excluding the information gathered from school records, all data were collected by a

trained interviewer during an in-home visit. Interviews lasted approximately 50 minutes, and questionnaires took about 30 minutes to complete. Most interviewers were women who had completed undergraduate degrees. An effort was made to match the race of interviewers and study participants. MADICS was designed to investigate the influences of neighborhood, family, school, and peer contexts on psychological determinants that affect individual choices and behavior. As such, the data were applicable to this study that applied cross-sectional, secondary analyses to examine the relations between school-based social contexts, adolescents' motivational beliefs, and student engagement.

Measures

All items, excluding the items that measured the outcome engagement, were coded or recoded so that higher scores reflected stronger evidence of the underlying construct. Additionally, some items were recoded with response categories collapsed to provide sufficient information to estimate the hypothesized models using the mean and variance adjusted weighted least squares (WLSMV) estimator in Mplus Version 7.

Independent Variable

Social context. This construct reflected students' perceptions of key dimensions of climate and support within the school environment. The scale consisted of seven Likert-type items. Three items emphasized school climate. These items focused on students' perceptions of care, encouragement, and feelings of belonging that characterized the school community. An example of these items: "At the school I go to now the staff cares about students as individuals." Items that measured care and encouragement were recoded with the two lowest response categories combined (i.e., "strongly disagree" and "disagree"). Recoding of these items produced four-point response scales that reflected sentiments

ranging from strongly disagree to strongly agree. The item that measured school-level belonging was recoded similarly with the lowest two response categories combined (i.e., “strongly disagree” and “disagree”). Because few students responded at the extreme ends of the response scale measuring perceptions of school-level belonging, the highest two response categories for this item also were combined (i.e., “agree” and “strongly agree”). After recoding, belonging was measured by a three-point scale that reflected sentiments of disagreement, neutrality, and agreement. After recoding, reverse coding was applied to items measuring care and belonging.

The remaining four items that defined the latent construct social context measured students’ perceptions of social support provided by teachers and peers. An example of these items: “When you have a social/personal problem at school, how often can you depend on your teachers to help you out?” The items that measured perceptions of teacher-based instrumental support and peer-based emotional support were recoded with the lowest two response categories (i.e., “almost never” and “not too often”) combined. After recoding, these items were measured by four-point response scales. Response categories expressed sentiments that ranged from “almost never” to “almost always.” The original coding scheme for the items measuring teacher-based emotional support and peer-based instrumental support was maintained (i.e., 1=almost never to 5=almost always).

Mediating Variables

Academic self-concept of ability beliefs. This construct represented adolescents’ perceptions of their competence in the academic domain. It included students’ evaluations of “how well they do” and “how good they are” in math and other subjects. The scale included three Likert-type items originally measured on seven-point response scales. Response

categories ranged from “not good at all” to “very good” and from “much worse than other kids” to “much better than other kids.” In general, this group of adolescents expressed strong positive perceptions of their own academic abilities. As a result, for all items measuring academic self-concept of ability beliefs, the first three response categories on the lower end of the scales were combined to form a single category. After recoding, all items that defined this construct were measured on five-point response scales.

Social self-concept of ability beliefs. This variable represented adolescents’ perceptions of their competence in the social domain. The scale was comprised of three items. Two items focused on students’ perceptions of their ability to make friends. The third item measured self-perceptions of popularity. The items that assessed ability to make friends and popularity were measured originally on seven-point response scales. Response categories for the items measuring the ability to make friends ranged from “not at all good” to “very good.” Response categories for the item measuring perceptions of popularity ranged from “much less than other kids” to “much more than other kids.” As noted with self-perceptions of academic ability, these youth tended to rate favorably their own abilities in the social domain. The items focused on the ability to make friends were recoded combining the lowest three response categories, resulting in a five-point measurement scale. The item measuring popularity was recoded combining the lowest two response categories, resulting in a six-point response scale.

Outcome Variable

Student engagement. This construct measured the degree to which adolescents expressed behaviors indicative of student engagement. This scale was comprised of three items that emphasized effort, compliance, and attendance. The first item, originally

measured on a six-point Likert-type scale, assessed the likelihood of skipping school and/or class. The item was recoded combining the upper three response categories, producing a four-point response scale that ranged from “very low” to “already happened.” The second item, originally measured on a five-point Likert-type scale, asked students about completing homework assignments. This item was recoded with the upper two response categories combined, resulting in a four-point response scale with categories that ranged from “strongly agree” to “strongly disagree.” The final item that measured the latent factor behavioral engagement reflected school attendance during seventh grade. This item originally was measured by the number of days a student was reported in school records as absent. The item was recoded into an eight-point response scale with categories that ranged from “0 to 2” to “more than 21” days absent during the school year.

Moderators and Covariates

Analyses were conducted to assess the moderating effects of gender and race on the structural associations between the social context of schooling, motivational beliefs, and student engagement. Studies that emphasize the influence of schools’ social contexts on student adjustment and achievement-related outcomes have increased significantly in the past decade. However, studies evaluating the influences of gender and race on these associations are limited.

Prior academic achievement and socioeconomic status (SES) represented covariates of student engagement in the proposed structural model. Students’ scores on the fifth grade California Achievement Test (CAT) were used as a measure of prior achievement. Comparably scaled measures of family income and primary caregiver’s educational attainment were summed to provide an estimated measure of SES. SES was not computed

for cases missing information for household income or caregiver education.

Scale Reliability

Cronbach's alpha is a commonly used means of estimating scale reliability (Sijtsma, 2009). However, scholars in the field of measurement have raised concerns about the use of Cronbach's alpha under certain circumstances. For example, alpha functions under the assumption that item responses are continuous and normally distributed. If these basic assumptions are violated, alpha may significantly underestimate scale reliability (Gadermann, Guhn, & Zumbo, 2012). Initial data screening indicated that the Likert-type items used in this study did not meet the recommended assumptions, and more realistically exemplified the characteristics of ordered categorical data (see Data Screening). In response, to estimate scale reliability, a decision was made to calculate ordinal coefficient alpha ([OCA] Zumbo, Gadermann, & Zeisser, 2007), a measure of internal consistency reliability adjusted for categorical data. Whereas Cronbach's alpha is based on Pearson's correlations and subject to violations of normality often associated with ordinal data, OCA is based on polychoric correlations. Polychoric correlations represent bivariate associations of hypothetical, continuous, and normally distributed variables extrapolated from ordered categorical data (Basto & Pereira, 2012). As such, polychoric correlations represent a more reliable means of examining associations between categorical indicators. The following formula from Zumbo et al. (2007) was applied to calculate estimates of OCA, where p was equal to the number of items comprising an individual scale, and p_{ave} was equal to the average polychoric correlation across all item pairs loading on the individual latent factor.

$$OCA = p * p_{ave} / (1 + (p-1) * p_{ave})$$

Data Preparation

The PASW (SPSS) 19 software package was used to screen and prepare data for analyses. A cross-validation technique, which employs separate subsamples for the calibration and validation of models, is recommended in SEM literature (Byrne, 2012; Kline, 2011; Tabachnick & Fidell, 2013). This technique was applied here with the overall sample divided into two roughly equal, random samples. One sample, the calibration sample, was earmarked for the estimation of hypothesized models and for minor model respecification when appropriate. The second sample, the validation sample, was reserved for replicating analyses conducted with the calibration sample to substantiate findings. After the data had been screened, recoded, and partitioned into calibration and validation samples, files were imported into Mplus Version 7 for subsequent analyses.

Data Screening

Initially, data were screened for violations of normality and missing values. Estimates of skewness and kurtosis, Q-Q Plots, and the Shapiro Wilk test were used to assess univariate normality. Observed variables exhibited various degrees of departure from expected values under a normal distribution. Table 3.1 provides a summary of descriptive statistics for the full sample as originally coded. Skewness statistics ranged from 0.035 to 3.027. Values for kurtosis ranged from -0.004 to 11.428. A variable that defined the outcome engagement produced a value for skewness greater than 2 and a value for kurtosis greater than 7. Kline (2011) identified these values as possible indications of extreme departures from normality. Examination of normality plots and the significance of p values associated with Shapiro Wilks tests evidenced potentially deleterious levels of non-normality in additional observed variables. Byrne (2012) has suggested that even when values for

kurtosis do not register as extreme, they may prove problematic for interpreting the χ^2 statistic and additional indices used to estimate model fit in Mplus. She emphasized that when indications characterize one or more variables as substantially kurtotic, there is a strong chance that data do not meet the assumption of multivariate normality.

When Likert-type indicators follow a normal distribution, and have at least five but preferably seven response categories, it is accepted practice to treat the data as continuous and to employ the maximum likelihood method of model estimation (Lubke & Muthén, 2004). The data used in this study did not sufficiently meet assumptions of normality recommended to effectively enact this practice. Indications that data violated assumptions of univariate and multivariate normality supported the decision to define the data as categorical. WLSMV was selected as the most appropriate means of estimating the fit of the hypothesized models. This decision was reviewed and supported by Cathy Zimmer, a statistical consultant at the Howard W. Odum Institute for Social Science. All measurement and structural models subsequently were estimated in Mplus Version 7 with the WLSMV estimator.

Missing Data

WLSMV in Mplus Version 7 utilizes a full information approach to model estimation. This technique does not replace missing values but fits the covariance structure to the raw data available for individual participants. It operates under the assumption that data are missing completely at random (MCAR) or missing at random (MAR). Data defined as MAR are characterized as missing in relation to one or more of the variables in the model. As a means of addressing the possibility of MAR data and retaining the full sample for analyses, variables that are most likely to be associated with patterns of missing data (gender,

race, SES, and prior achievement) were accounted for in the proposed structural models (Widaman, 2006).

The full data set ($n = 1,360$) was screened for missingness. The 16 observed indicators in the measurement model had percentages of missing values ranging from 0.25% to 5.75%. The items utilized as covariates in the proposed structural models had the highest percentages of cases with missing data. Table 3.2 details the percentages of missing data in the calibration and validation samples respectively. Because the estimation technique utilized full information and there were low percentages of missing values on observed indicators, the decision was made not to impute values for missing data.

Analytic Plan

The overarching goal of this study was to shed light on the influences of contextual, psychological, and demographic factors that contribute to the development of student engagement. As a confirmatory technique, SEM provided a means to assess complex models comprised of latent variables, multiple pathways of influence, and processes that mediated the expression of students' behavioral engagement with schooling. Preliminary analyses employed confirmatory factor analysis (CFA) to estimate a baseline measurement model and to test for invariance of the measurement model across gender and racial groups. Primary analyses involved estimation of the full structural models, which included measurement components and path estimates between the latent variables. Analyses were conducted to test for moderation of the path estimates by gender and racial groups in the structural models. The following sections overview these processes. All results are reported in Chapter 4.

Table 3.1

Descriptive Statistics for the Full Sample Prior to Recoding

Variable	<i>n</i>	Minimum Value	Maximum Value	Mean	<i>SD</i>	Skewness	Kurtosis	Shapiro-Wilk
Staff cares	1344	1	5	3.56	1.024	-.534	-.197	*
Staff does not encourage	1346	1	5	3.71	1.097	-.677	-.234	*
Kids belong	1346	1	5	3.45	.858	-.327	-.004	*
Teacher support emotional	1352	1	5	3.02	1.205	-.069	-.869	*
Teacher support instrumental	1356	1	5	3.65	1.138	-.554	-.479	*
Peer support emotional	1352	1	5	3.44	1.175	-.362	-.703	*
Peer support instrumental	1344	1	5	2.91	1.226	.067	-.970	*
Good at math 1	1340	1	7	5.31	1.445	-.659	.038	*
Good at other subjects	1330	1	7	5.31	1.206	-.474	.044	*
Good at math 2	1342	1	7	5.34	1.596	-.785	-.107	*

Variable	<i>n</i>	Minimum Value	Maximum Value	Mean	<i>SD</i>	Skewness	Kurtosis	Shapiro-Wilk
Making friends 1	1334	1	7	5.38	1.453	-.890	.367	*
Making friends 2	1342	1	7	5.71	1.433	-1.204	1.113	*
How popular	1337	1	7	4.57	1.627	-.385	-.498	*
Skip/cut classes	1347	1	6	1.41	.842	3.027	11.428	*
Usually finish homework	1357	1	5	1.91	.754	1.266	2.995	*
Attendance	1282	0	40	9.61	7.870	1.254	1.354	*
SES	1270	9	41	23.95	5.661	.035	-.690	*
Prior achievement	1041	371	661	507.46	53.799	.159	-.431	*

Note. A significant *p* value associated with the Shapiro-Wilk test for normality is indicative of data that are not normally distributed.

* $p < .05$ one-tailed

Table 3.2

Summary of Missing Data in Calibration and Validation Samples

Latent Construct	Percentage of Missing Data	
	Calibration (<i>n</i> =695)	Validation (<i>n</i> =665)
Social Context		
Care	1.0	1.4
Encouragement	.9	1.2
Belonging	.9	1.2
Teacher Emotional Support	.6	.6
Teacher Instrumental Support	.3	.3
Peer Emotional Support	.4	.8
Peer Instrumental Support	1.0	1.4
Academic Self-Concept of Ability Beliefs		
Math 1	1.3	1.7
Other Subjects	2.3	2.1
Math 2	1.3	1.4
Social Self-Concept of Ability Beliefs		
Making Friends 1	2.2	1.7
Making Friends 2	1.3	1.4
Popular	1.7	1.7
Engagement		
Skip or Cut Classes	1.2	.8
Homework	.3	.2
Attendance	5.6	5.9
Moderators		
Gender	0.0	0.0
Race	0.0	0.0
Covariates		
Socioeconomic Status	6.2	7.1
Prior Achievement	20.7	26.3

Preliminary Analyses

Estimating the measurement model. Within the context of psychological research, many phenomena, such as social context, self-concept of ability beliefs, and student engagement are not readily observable. SEM enables the construction of latent variables through the selection of observed or measured indicators to signify latent factors (Kline, 2011). Observed indicators and the latent constructs they represent make up the measurement components of the model and are referred to here as the measurement model. Byrne (2012) and others (Brown, 2006; Kline, 2011; Tabachnick & Fidell, 2013) have recommended beginning the process of SEM with CFA as a means to evaluate the fit of the measurement model to the sample data. More specifically, CFA is used as a means to assess the integrity of the proposed latent constructs. The technique achieves this through examination of the patterns of covariation among defined sets of variables and the provision of information regarding the relationship between measured indicators and the latent factors they assert to measure (Byrne, 2012).

When the WLSMV estimator in Mplus is utilized, CFA results are interpreted with regards to overall model fit and the sign and significance of estimated factor loadings (UCLA: Statistical Consulting Group, [accessed July 31, 2013]). Because the path estimates that link latent factors with observed categorical indicators are probit scaled, the magnitudes of individual factor loadings are not interpreted. The chi-square (χ^2) statistic represents a measure of overall model fit. A nonsignificant p value ($p < .05$) associated with χ^2 is one indication of a well-fitting model. However, sensitivity to sample size is a noted limitation associated with χ^2 with larger samples ($N > 200$) more likely to produce a significant χ^2 (Kenny, 2011). Because of this limitation, various fit indices have been developed to aid in

the evaluation of model fit. Common goodness-of-fit indices used to interpret models estimated with WLSMV include the root mean square error of approximation (RMSEA), Comparative Fit Index (CFI), Tucker Lewis Index (TLI), and weighted root mean square residual (WRMR) (Schreiber, Stage, King, Nora, & Barlow, 2006). These indices are reported by Mplus Version 7 and were used to interpret the fit of the measurement and the structural models estimated here. Reasonable model fit was assumed when RMSEA was less than or equal to .06, CFI and TLI were approximately or greater than .95, and when WRMR was near to or less than 1.00 (Byrne, 2012; Kline, 2011; Yu & Muthén, 2002). It should be noted that Linda Muthén noted on the Mplus discussion board (Feb. 11, 2010) that WRMR is an experimental statistic than can be used as a measure of overall model fit when estimating models with categorical data. She stated that because research is limited, a WRMR larger than 1.00 should not be cause for concern when other fit indices are acceptable.

To conduct CFA, an identified model, one for which it is “theoretically possible to derive a unique estimate for each parameter” (Kline, 2011, p. 144), is necessary. Kline outlined two conditions that must be met for a measurement model to be considered identified. The model must have equal or fewer free or unknown parameters than the number of known or measured observations, and each latent construct must have a scale. To achieve these specifications, two strategies were employed. All of the latent factors were measured by at least three individual indicators. This created the condition in which the number of measured observations was greater than the number of parameters to be estimated. To meet Kline’s second condition, the direct effect of one indicator for each of the latent variables was constrained to equal one. To account for students being nested within schools, the Mplus commands for complex data and stratification (School ID) were employed.

The calibration sample was used to estimate the hypothesized baseline measurement model. In CFA, the command for stratification was invoked as students were sampled from all 23 junior high schools across a single school district. Goodness-of-fit indices indicated model fit was less than acceptable. Modification indices provided by Mplus indicated that model fit would improve with the addition of a residual covariance between the peer support indicators on the latent factor Social Context and a residual covariance between the math items on the latent factor Academic Self-Concept of Ability Beliefs. Model respecification based on the interpretation of fit and modification indices is deemed acceptable when changes are theoretically and/or methodologically justified (Kline, 2011). Here, added residual covariances were associated with items worded similarly and placed in close proximity on the same questionnaire. Brown (2006) identified these circumstances as sound methodological rationale for model respecification. In light of changes to the original model, the character of the research is hereafter defined as exploratory. The minor respecifications described above produced evidence of a well-fitting model. The revised model then was estimated in the validation sample. Results demonstrated reasonable model fit to the sample data. The respecified model (Figure 3) was accepted as the baseline measurement model to be used in subsequent analyses. Results of the original and respecified models are reported in Chapter 4.

Evaluating measurement invariance. After the baseline measurement model was established, multigroup confirmatory factor analyses (MGCFA) were conducted to evaluate measurement invariance (MI). MI assessed the extent to which the fit of the measurement model was invariant across groups defined separately by gender and racial group membership. Establishing MI is a critical precursor to making meaningful cross-group

comparisons in psychological research (Milfont & Fischer, 2010; Vandenberg & Lance, 2000). Techniques to evaluate MI in ordered categorical data are actively evolving. The approach utilized here draws on techniques outlined by Muthén and Muthén (2012) and by Millsap and Yun-Tein (2004). Roger Millsap, a faculty member in the Department of Psychology at the University of Arizona provided additional consultation via email.

MI is evaluated by implementing CFA techniques to estimate a series of increasingly restrictive, nested models. The fit of the more restrictive model is compared with the previous model to determine whether the more constrained model should be rejected, accepted, or revised. The number and type of models used in a specific study is contingent on the nature of the research questions and the type of data available. Milfont and Fischer (2010) provided a concise summary of the range of models appropriate for evaluating MI. This study employed categorical data; therefore, the three-model approach proposed by Millsap and Yun-Tien (2004) was adopted. The following three sections provide an overview of the process. Results for all MI models are presented in Chapter 4.

Configural invariance. First, multigroup models were estimated to determine whether the basic factor structure of the model was invariant across groups defined by gender and race, respectively. A well-fitting configural model suggests that participants have interpreted constructs similarly (Milfont & Fischer, 2010). To estimate the configural models, the factorial structure of each model was constrained to be equal across groups. Identification issues are common in fitting configural models. To address this issue, an equality constraint was specified for two item response thresholds on the first item of each latent factor (Millsap & Yun-Tien, 2010). In addition, in the gender configural model for the

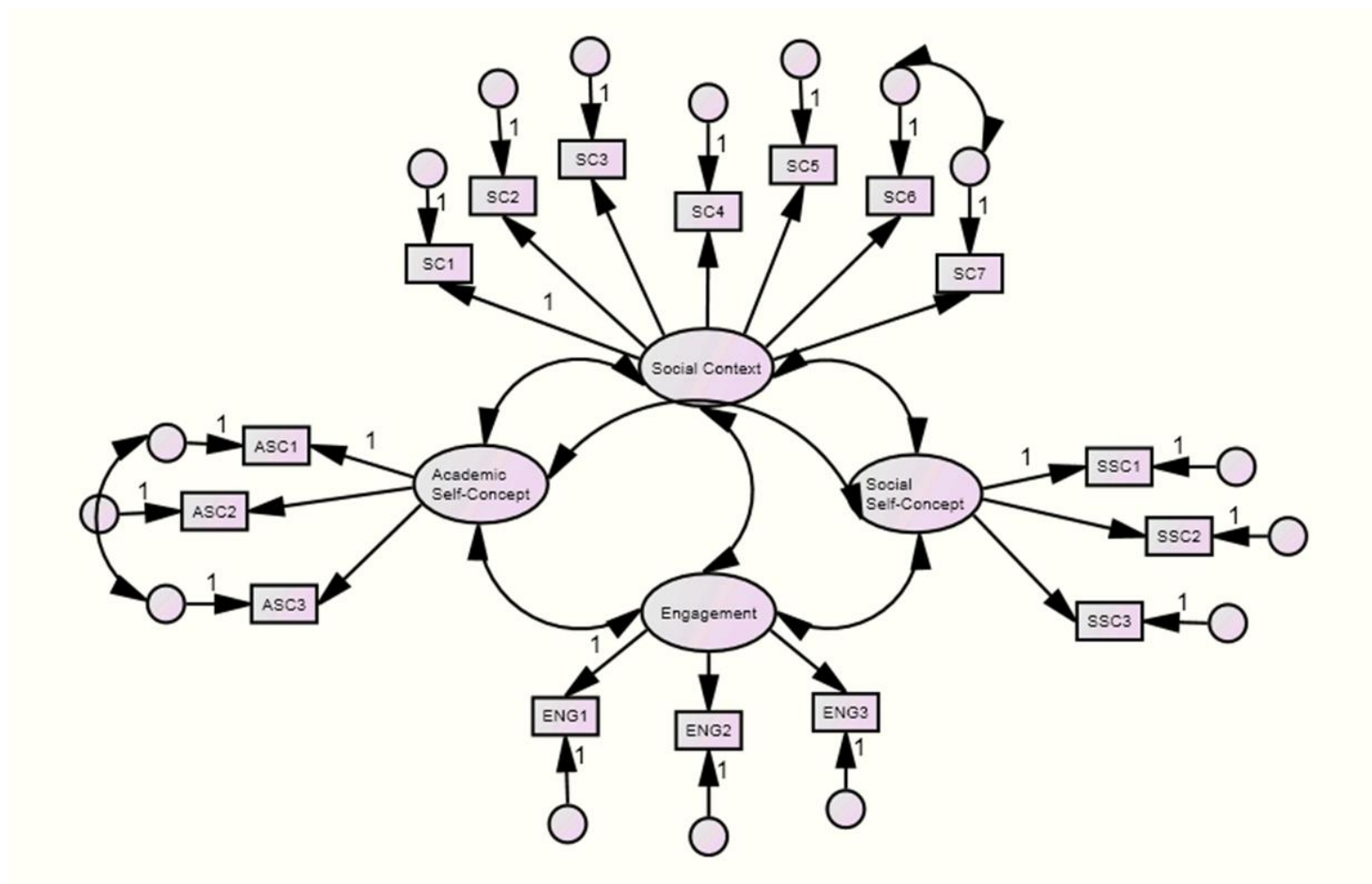


Figure 3. Final baseline measurement model.

first group (0=girls), and in the racial configural model for the first group (0=African Americans), factor means were set to zero, factor variances were fixed at one, and item thresholds (excluding those constrained equal for identification purposes) were free to vary. In the second groups (1=boys, 1=Whites), factor means, variances, and item thresholds were free to vary. The same goodness-of-fit indices utilized to evaluate the baseline model were applied to assess the fit of the configural and subsequent invariance models.

Metric invariance. Next, multigroup metric models were estimated with factor loadings constrained across groups to determine whether the magnitude of factor loadings varied significantly by gender and separately by race. Metric invariance suggests that the magnitude of associations between factor indicators and latent factors does not vary significantly as a result of group membership (Milfont & Fischer, 2010). Here, the metric model tested whether male and female and subsequently whether African American and White students responded similarly to individual items. Metric invariance was tested by maintaining the pattern of constraints defined in the configural model plus constraining all factor loadings to be equal across groups defined first by gender and then by race.

When testing for MI, goodness-of-fit indices continue to aid in the evaluation of overall model fit. However, it is the chi-square difference test that defines the standard for comparing the fit of nested models (Muthén & Muthén, 2012). The DIFFTEST option in Mplus Version 7 is employed to calculate the adjusted value for χ^2 associated with nested models defined by categorical data. A nonsignificant χ^2 ($p > .05$) implies that the fit of the more restricted metric model does not differ significantly from the fit of the less constrained configural model. With a nonsignificant χ^2 , it is reasonable to assume metric invariance or the equivalence of factor loadings across groups. A significant χ^2 would imply

nonequivalence of factor loadings across groups. Should this be the case, modification indices for individual factor loadings are examined to determine the most likely source of metric invariance. With theoretical or methodological justification, factor loadings with the highest modification indices can be unconstrained one at a time and the model reestimated to determine whether the claim of partial invariance (Muthén & Muthén, 2012) is supported. No definitive guideline for asserting partial invariance has been established. Vandenberg and Lance (2000) and Reise, Widaman, and Pugh (1993) support the claim of partial invariance when a majority of factor loadings (partial metric invariance) or the majority of intercepts or thresholds (partial scalar invariance with continuous and categorical data respectively) are equivalent. Dimitrov (2010) supports asserting partial invariance in cases where less than 20% of factor loadings and intercepts or thresholds are nonequivalent.

Scalar invariance. Finally, multigroup scalar models that constrained both factor loadings and thresholds were estimated. Evidence of scalar invariance demonstrates that individuals who share a common score on a latent factor would have a similar probability of choosing a particular answer on a measured item regardless of group membership (Millsap & Fischer, 2010). The scalar model was estimated by maintaining the pattern of constraints defined in the metric model plus constraining all item thresholds to be equal across groups defined by gender and race, respectively. As outlined above, the chi-square test of difference for nested models was examined to compare the fit of the more highly constrained scalar model with the fit of the less restrictive metric model. A nonsignificant χ^2 would indicate equality of item thresholds across groups and provide evidence of scalar invariance. A significant χ^2 would be indicative of nonequivalence of item thresholds associated with group membership. Scalar models were estimated, and the process of examining

modification indices and freeing select item thresholds to vary across groups was employed to establish claims of partial scalar invariance. This study employed the more conservative recommendation of less than 20% noninvariant thresholds to claim partial scalar invariance.

Estimating the Structural Models

Two multigroup structural models were estimated. Groups were defined by gender in the first model and by race in the second. Structural models incorporated the baseline measurement model and included the stratification command to account for nested data, unique threshold constraints, the covariates SES and Prior Achievement, and a path model defined by directional paths linking latent constructs. The criteria used to evaluate the fit of the baseline measurement model were applied to the full structural model with the addition of evaluation of parameter estimates between latent factors. The calibration sample was used to estimate the structural models for gender and race, respectively. These models were re-estimated with the validation sample as a means to assess the stability of findings produced in the calibration sample.

Path models hypothesized a direct positive effect between students' perceptions of social context and behavioral engagement. This direct effect was evaluated by the statistical significance of the estimated path coefficient that linked the latent factors social context and engagement. In addition, indirect or mediated effects of social context (exerting influence through academic and social self-concept of ability beliefs) were assessed. Evaluation of the mediating effects of self-concept of ability beliefs in the model was an important dimension of the proposed study in that a mediator is conceptualized as a process or mechanism by which one variable exerts influence on another (Baron & Kenny, 1986). As noted earlier, research to date reflects an ongoing need to identify the mechanisms through which social

processes affect academic engagement and outcomes (Wentzel & Wigfield, 2007). To evaluate mediation hypotheses, the Model Indirect command in Mplus Version 7 was applied. Mplus uses the delta method to calculate mediated or indirect effects. The delta method (MacKinnon, 2008) calculates the ratios between the product of sets of coefficients that represent mediated pathways and their standard errors and then determines p values for these ratios based on a normal sampling distribution. A significant p value ($p < .05$) supports the presence of mediation in the model.

Test of moderation. After estimation of the structural models, a second series of multigroup models was estimated to test whether gender and race moderated the structural relations in the model. First for gender and then for race, a model was estimated in which all paths linking latent factors were constrained to be equal across groups. The DIFFTEST option was used to compute the appropriately adjusted chi-square difference test to compare the results of the fully constrained models to the results of the models previously estimated in which all paths linking latent factors were freely estimated across groups. A significant p value ($p < .05$) for the chi-square difference test would indicate that the structural relations in the models varied as a function of gender and/or race.

Summary

This chapter provided information on study participants, data collection procedures, indicators, latent factors, and structural pathways comprising the hypothesized models. The chapter outlined steps taken to prepare the data for analysis, including screening for violations of distributional assumptions and missing data. The chapter presented the analytic plan outlining preliminary and primary analyses. Preliminary analyses included CFA techniques to estimate the measurement model and to test the model for measurement

invariance across groups defined by gender and race. Primary analyses included estimation of the full structural models and analyses to determine whether the structural pathways linking latent constructs in the model were moderated by gender and race. Results of these analyses are presented in Chapter 4.

CHAPTER 4: RESULTS

This study employed structural equation modeling (SEM) techniques to evaluate a model of student engagement. The proposed model of engagement emphasized the contributions of the school's social context and of adolescents' self-concept of ability beliefs in academic and social domains. This chapter presents the results of the statistical analyses. Descriptive statistics for the variables in the model are presented first, followed by preliminary findings, which include the results of the baseline measurement model and tests of measurement invariance (MI). Next, results of primary analyses or findings associated with the estimation of the full structural model are summarized. These findings directly address hypotheses that defined this dissertation study. Hypotheses emphasized (a) direct effects between social context (SC) and student engagement (ENG) and between social self-concept of ability beliefs (SSC) and academic self-concept of ability of ability beliefs (ASC); (b) indirect or mediated effects of SC on ENG working through self-concept of ability beliefs; and (c) the moderating effects of gender and race on the structural relations in the model.

Descriptive Statistics

Data used in completion of this dissertation were nested, cross-sectional, secondary data collected during the first wave of the longitudinal Maryland Adolescent Development in Context Study ([MADICS], Eccles, 1997). Due to patterns of skewness and kurtosis in the data that exceeded expected values under a normal distribution, Likert-scaled indicators were treated as ordered categorical data. When modeling continuous data,

parameter estimates in Mplus are derived from Pearson's correlations or patterns of covariance between measured variables. In contrast, when modeling ordered categorical data, Mplus employs WLSMV, which applies a probit function to link indicators with theorized continuous latent variables. Conditional probability plays a significant role in model estimation with WLSMV. Therefore, the number of responses in a particular response category signifies an important means of summarizing data. As such, Appendix A reports the frequencies and percentages of the categorical variables in the hypothesized model. Table 4.1 summarizes measures of central tendency and dispersion for the 16 ordinal indicators in the model. Descriptive statistics for the two continuous variables included as covariates in the model (i.e., SES and Prior Achievement) are reported in Chapter 3.

Table 4.1

Descriptive Statistics for Ordinal Indicators of Latent Factors

Indicator	<u>Calibration Sample</u>			<i>SD</i>	Min	Max
	Mean	Median	Mode			
Staff cares	2.58	3.00	3	.96	1	4
Staff does not encourage	2.78	3.00	3	1.01	1	4
Kids belong	2.36	2.00	3	.70	1	3
Teacher support emotional	3.06	3.00	3	1.21	1	5
Teacher support instrumental	2.68	3.00	3	1.05	1	4
Peer support emotional	2.52	3.00	3	1.02	1	4
Peer support instrumental	2.95	3.00	3	1.21	1	5
Good at math 1	3.35	3.00	4	1.28	1	5
Good at other subjects	3.34	3.00	4	1.16	1	5
Good at math 2	3.51	4.00	5	1.40	1	5
Good at making friends 1	3.45	4.00	4	1.30	1	5
Good at making friends 2	3.80	4.00	5	1.27	1	5
How popular are you	3.65	4.00	4	1.52	1	6
Skip school or cut classes	1.35	1.00	1	.68	1	4
Usually finish homework	1.89	2.00	2	.73	1	4
7th grade absences	3.63	3.00	2	2.17	1	8

Indicator	Validation Sample			<i>SD</i>	Min	Max
	Mean	Median	Mode			
Staff cares	2.61	3.00	3	.92	1	4
Staff does not encourage	2.72	3.00	3	1.00	1	4
Kids belong	2.40	3.00	3	.68	1	3
Teacher support emotional	2.97	3.00	3	1.19	1	5
Teacher support instrumental	2.72	3.00	3	1.02	1	4
Peer support emotional	2.49	2.00	3	1.08	1	4
Peer support instrumental	2.86	3.00	2	1.23	1	5
Good at math 1	3.27	3.00	3	1.32	1	5
Good at other subjects	3.31	3.00	3	1.14	1	5
Good at math 2	3.34	4.00	5	1.42	1	5
Good at making friends 1	3.44	4.00	4	1.28	1	5
Good at making friends 2	3.73	4.00	5	1.29	1	5
How popular are you	3.59	4.00	3	1.52	1	6
Skip school or cut classes	1.41	1.00	1	.71	1	4
Usually finish homework	1.91	2.00	2	.70	1	4
7 th grade absences	3.80	3.00	2	2.20	1	8

Preliminary Analyses

Findings associated with preliminary analyses summarize the results of confirmatory factor analysis (CFA). Also included here are the results of MI models to determine the extent to which the measurement model was invariant across groups defined by gender and race, respectively.

Results of Confirmatory Factor Analysis

CFA was employed to determine whether observed indicators represented reasonable measures of the latent constructs in the proposed model of student engagement. To account for students enrolled in different school settings, Mplus commands for complex data and stratification were applied. The hypothesized measurement model was defined by four continuous latent factors and 16 ordered categorical indicators (Figure 3, pg. 63). The

calibration sample ($n = 695$) was used to evaluate and refine the baseline measurement model. The model proposed no cross-loading of individual items or correlations between measurement errors. Correlations between latent factors ranged from 0.05 to 0.51. In the calibration sample, all correlations between latent factors were significant at the $p < .01$ level, with one exception. The correlation between SSC and ENG was nonsignificant ($p = .38$). This pattern was reproduced when the model was fit to the cross-validation sample data.

Fit of the baseline measurement model. The chi-square statistic and goodness-of-fit indices indicated the proposed measurement model represented a poor fit to the calibration sample data ($\chi^2 = 499.03$, $df = 98$, $n = 695$, $p < .001$], RMSEA = .07 with 90% CI of .07 to .08, CFI = .93, TLI = .91, WRMR = 1.67). The RMSEA and WRMR were higher than recommended values, whereas CFI and TLI were less than values suggestive of good model fit. Examination of the modification indices provided by Mplus indicated model fit would improve with the addition of an error covariance between peer emotional support and peer instrumental support, and an additional error covariance between the two items focused on math self-concept of ability beliefs. These additions to the model were deemed reasonable, based on the placement of items in the questionnaire and the similarity of item wording. The revised model with added error covariances produced fit indices that indicated acceptable fit to the sample data ($\chi^2 = 252.29$, $df = 96$, $n = 695$, $p < .001$], RMSEA = .04 with 90% CI of .04 to .05, CFI = .97, TLI = .96, and WRMR = 1.157). To test the stability of the measurement model, the revised model was estimated in the cross-validation sample. Fit indices summarized in Table 4.2 indicated a well-fitting model, and this model was accepted as the baseline measurement model for use in subsequent analyses.

Although goodness-of-fit indices inform overall model fit, the significance of factor

loadings provides additional insight into the soundness of the measurement model as factor loadings suggest whether indicators effectively measure the constructs they represent. With the exception of parameters fixed for identification purposes, all factor loadings were significant. Table 4.3 reports parameter estimates and scale reliabilities for the measurement model estimated in the full calibration and cross-validation samples. When the measurement model was estimated in the calibration sample by gender and racial groups, all factor loadings except for one loading in one group were significant at $\alpha = .05$. ABS on ENG in the boys group did not reach statistical significance ($p = .304$). However, when the measurement model was estimated in the cross-validation sample by gender and racial groups, all factor loadings for all groups were significant at $\alpha = .05$.

Table 4.2

Goodness of Fit Indices for the Revised Baseline Measurement Model

Sample	χ^2	<i>df</i>	RMSEA	CFI	TLI	WRMR
Calibration <i>n</i> = 695	252.92***	96	.04	.97	.96	1.15
Validation <i>n</i> = 665	284.23***	96	.05	.97	.96	1.19

Note. The following criteria were used to evaluate model fit: RMSEA < .06, CFI \geq .95, TLI \geq .95, WRMR \approx 1 (see Chapter 3 note for information on WRMR).

*** $p < .001$ (one-tailed tests)

A potentially deleterious finding associated with CFA was that the scale reliability estimate for the latent factor representing student engagement was notably low in the calibration and cross-validation samples. Due to a lack of substitute indicators for behavioral engagement in the MADICS dataset, analyses proceeded with the latent factors as defined in Table 4.3. This represents a notable but irreconcilable weakness of the study and necessitates cautious consideration of the study's findings.

Measurement Invariance

A sequence of multigroup models was estimated to determine whether the measurement model was invariant across groups defined by gender and race, respectively. All MI models were estimated with the WLSMV estimator and THETA parameterization. Model fit was assessed with the goodness-of-fit indices and criteria presented in Table 4.2. The school identification variable was included in the stratification command in order to produce parameter estimates that would be adjusted appropriately for nested data. The progression of model testing to evaluate MI followed recommendations outlined by Millsap and Yun-Tien (2010) and described in Chapter 3. The chi-square test of difference (DIFFTEST) option in Mplus was used to evaluate whether chi-square differed significantly between nested and increasingly constrained models. For clarity, results are presented separately for gender and racial invariance. Table 4.4 represents a comprehensive summary of the findings associated with the estimation of models to evaluate measurement invariance.

Gender invariance. Evaluation of the measurement model for invariance across gender groups was initiated by fitting a configural model to the calibration sample data. A well-fitting configural model provides evidence that the pattern of factor loadings established by the baseline measurement model effectively characterizes the data provided by specified groups. Invariance testing should not proceed in the absence of a well-fitting configural model as the configural model provides the basis for comparison for subsequent invariance models (Milfont & Fischer, 2010). The configural model constrained the overall factor structure of the baseline measurement model to be equivalent across girls and boys. Results suggested that the hypothesized factor structure fit well for both groups. The multigroup gender model produced a χ^2 of 342.019 with 198 degrees of freedom. The contribution to the

Table 4.3

<i>Baseline Measurement Model: Factor Loadings and Scale Reliability Estimates</i>					
Factor	Indicator	Estimate	S.E.	P Value	OCA
Social Context by:	SC1	.43/.53	.04 /.04	***/**	
	SC2	.43/.52	.050 /.04	***/**	
	SC3	.28/.41	.05/.05	***/**	
	SC4	.61/.50	.04 /.04	***/**	
	SC5	.51/.54	.04/.04	***/**	
	SC6	.25/.32	.05/.04	***/**	
	SC7	.22/.36	.05/04	***/**	.60/.66
ASC by:	ASC1	.65/.60	.03/.04	***/**	
	ASC2	.88/.93	.04//01	***/**	
	ASC2	.46/.44	.04/.04	***/**	.80/.80
SSC by:	SSC1	.92/.93	.01/.01	***/**	
	SSC2	.90/.88	.01/.01	***/**	
	SSC3	.63/.65	.02/.02	***/**	.85/.86
Engagement by:	ENG1	.49/.44	.06/.06	***/**	
	ENG2	.67/.58	.07/.07	***/**	
	ENG3	.17/.34	.05/.06	**/**	.48/.50

Note. Calibration /Validation, OCA Ordinal Coefficient Alpha

*** $p < .001$, ** $p < .01$ (two-tailed)

overall chi-square from girls ($n = 343$) was 134.19. The contribution from boys ($n = 352$) was 207.82. While chi-square was significant ($p < .001$), fit indices demonstrated a configural model with acceptable fit to the sample data (e.g., RMSEA = .046 with a 90% CI of .03 to .05, CFI = .97, TLI = .96). The configural model then estimated in the cross-validation sample. Results supported initial findings indicative of configural invariance.

Subsequently, metric invariance across gender groups was evaluated. A well-fitting metric model indicates that the magnitudes of the relations between scale items and latent factors do not vary across groups. Metric invariance suggests that groups have responded to items similarly. Evidence of metric invariance supports the possibility of making effective comparisons of item responses across groups (Milfont & Fischer, 2010). The metric model constrained factor structure and loadings to be equal across gender groups. Chi-square was estimated at 347.66 with 204 degrees of freedom ($n = 695$). Goodness-of-fit indices indicated a model with acceptable fit to the sample data. The DIFFTEST comparing the metric to the configural model was nonsignificant ($\chi^2 = 7.33$, $df = 6$, $n = 695$, $p = .29$). This finding indicated that the more restrictive metric model did not result in significant deterioration of model fit. As such, the claim of full metric invariance was supported. This finding was replicated in the cross-validation sample.

After demonstrating evidence of metric invariance, scalar invariance across gender groups was evaluated. The scalar model determines the extent to which item response thresholds are invariant across racial groups. Evidence of scalar invariance enables the researcher to effectively compare latent factor means across groups as scalar invariance implies cross-group equivalency of relations between observed scores and factor scores (Milfont & Fischer, 2010). The scalar model constrained factor structure, factor loadings,

and thresholds to be equal across groups. Estimation of the scalar model in the calibration sample produced fit indices that indicated a good overall fit to the data. However, the DIFFTEST was significant ($\chi^2 = 185.38$, $df = 40$, $n = 695$, $p < .001$). In this context of nested model comparison utilizing the DIFFTEST option in Mplus, a significant chi-square statistic signified a scalar model with significantly worse fit to the data in comparison with the less constrained metric model. Large modification indices were associated with thresholds 1 and 3 of indicator SC6. Equality constraints across gender groups on these thresholds were removed. Estimation of the revised scalar model (Scalar G2) produced a significant DIFFTEST ($\chi^2 = 138.67$, $df = 38$, $n = 695$, $p < .001$) and demonstrated deterioration in model fit between the metric model and the Scalar G2 model. Modification indices produced in the estimation of Scalar G2, identified threshold 2 of indicator SC6 and threshold 4 of indicator SC7 as the greatest remaining sources of model misfit. After freeing these additional thresholds, the model (Scalar G3) continued to show significantly worse fit than the metric model (DIFFTEST $\chi^2 = 103.71$, $df = 36$, $n = 695$, $p < .001$). In accordance with modification indices, a fourth scalar invariance model (Scalar G4) was estimated. After freeing constraints on threshold 3 of indicator SC7 and threshold 3 of indicator SC2, the DIFFTEST remained significant ($\chi^2 = 58.49$, $df = 34$, $n = 695$, $p = .005$). A fifth scalar invariance model (Scalar G5) was estimated after equality constraints were relaxed on the remaining significant modification indices associated with item response thresholds (thresholds 1 and 2 of SC7 and threshold 3 of ASC2). The estimated p value for this DIFFTEST was nonsignificant ($\chi^2 = 40.72$, $df = 31$, $n = 695$, $p = .114$). With parameter constraints freed on eight out of 22 item response thresholds that defined the latent variable SC, and one out of 12 thresholds that defined the latent construct ASC, there was no significant worsening of fit in

comparing the gender scalar and gender metric models. This finding was indicative of partial scalar invariance.

Partial invariance is a recognized construct in psychological literature (Byrne, Shavelson, & Múthen, 1989; Reise, Widaman, & Pugh, 1993; Steenkamp & Baumgartner, 1998; Vandenberg & Lance, 2000). There is no set standard as to the degree of partial invariance that is acceptable. Some scholars support a claim of partial invariance when the majority of indicators of a latent variable are invariant across groups (Reise et al., 1993; Vandenberg & Lance, 2000). Others suggest a context-specific standard for the claim of partial invariance defined and reported by the researcher (Byrne et al., 1989; Levine et al., 2003). In line with the more specific standard for claims of partial MI put forth by Reise, Widaman, and Pugh (1993) and Vandenberg and Lance (2000), partial scalar invariance of the baseline measurement model across gender groups was supported.

Additional support for the claim of partial scalar invariance was generated by fitting the scalar model in the cross-validation sample. Notably, the exact pattern of threshold invariance found in the calibration sample was not replicated in the validation sample. Roger Millsap, a leading scholar in the field of MI, explained that the split sample method of cross-validation would not necessarily be effective in the context of evaluating scalar invariance. He confirmed sampling error associated with smaller frequency counts in some response categories as an obstacle to reproducing the exact pattern of invariance found in the calibration sample (R. Millsap, personal communication, March 9, 2013). To account for partial scalar invariance and to safeguard the meaningfulness of cross-group comparisons, subsequent structural analyses modeled the unique patterns of threshold noninvariance associated with the calibration and cross-validation samples.

Racial invariance. The same basic procedures applied to test MI across groups defined by gender were enacted to test the invariance of the baseline measurement model across groups defined by race (i.e., African American and White). Results of the multigroup configural model indicated that the factor structure of the measurement model was invariant across the two racial groups. The model produced a chi-square statistic of 382.25 with 198 degrees of freedom. The African American group ($n = 462$) contributed 195.20 to the overall chi-square statistic, while the White group ($n = 233$) contributed 191.04. While chi-square was significant at $\alpha = .05$, goodness-of-fit indices indicated a configural model with acceptable fit to the sample data. (e.g., RMSEA = .05 with a 90% CI of .04 to .06, CFI = .96, TLI = .95). Additional evidence supportive of configural invariance was produced when the model was fit to the cross-validation sample data.

After finding reasonable evidence of configural invariance, the metric model was estimated. Chi-square (389.05) was significant at $\alpha = .05$ with 204 degrees of freedom. However, fit indices suggested acceptable model fit to the sample data. Moreover, the DIFFTEST was nonsignificant ($\chi^2 = 4.80$, $df = 6$, $n = 695$, $p = .569$) and supported a claim of metric invariance across racial groups. When the metric model was fitted in the cross-validation sample, results further demonstrated metric invariance across groups defined by race.

Subsequently, the scalar model was estimated. With all item response thresholds constrained, goodness-of-fit indices continued to indicate a well-fitting model. However, the DIFFTEST produced a significant chi-square ($\chi^2 = 95.58$, $df = 40$, $n = 695$, $p < .001$), which signified a deterioration in model fit. Modification indices identified thresholds 3 of SC6 and 1 of ENG2 as the largest sources of model misfit. Estimation of a second scalar model

(Scalar R2) with equality constraints relaxed on these two thresholds produced reasonable fit indices, but the DIFFTEST remained significant ($\chi^2 = 69.42$, $df = 38$, $n = 695$, $p = .001$). A third scalar model (Scalar R3) was estimated after freeing threshold 3 of SC2. This model demonstrated acceptable model fit, but the DIFFTEST remained significant ($\chi^2 = 62.83$, $df = 37$, $n = 695$, $p = .005$). Modification indices did not identify additional threshold constraints contributing significantly to model misfit. This implied the source of measurement noninvariance was beyond the level of strong invariance tested by the scalar model. As such, a claim of partial scalar invariance was supported. Additional support for partial scalar invariance across racial groups was produced when the scalar model was fit to the validation sample data. Two noteworthy differences emerged. First, as was the result in fitting the gender scalar model, a slightly different pattern of threshold invariance across racial groups was found between the calibration and validation samples. Second, in the validation sample, the final partial scalar model produced a nonsignificant DIFFTEST ($\chi^2 = 39.97$, $df = 34$, $n = 695$, $p = .22$), demonstrating partial scalar invariance across racial groups.

Summary of MI results. Tests to evaluate MI supported claims of full configural and metric invariance across groups defined by gender and race, respectively. Results also demonstrated partial threshold invariance within gender and racial groups, respectively. In accordance with current recommendations (Millsap & Yun-Tien, 2010; Muthén & Muthén, 2012) and in line with evolving research practices associated with the modeling of categorical data (Kim & Yoon, 2011; Rosen, Beron, & Underwood, 2012), these findings established justification for the use of multigroup structural modeling techniques that derive meaning based on cross-group comparisons of factor means.

Table 4.4

Invariance Models for the Four-Factor Model of Student Engagement

81

Gender Models	Goodness-of-fit Statistics						Model Comparison	
	χ^2	<i>df</i>	CFI	TLI	RMSEA	WRMR	$\Delta\chi^2$	<i>p</i> value
Configural (C)	342.01	198	.97	.96	.04	1.35		
Metric (C)	347.66	204	.97	.97	.04	1.36	7.22	.30
Scalar(C)	509.79	244	.95	.95	.05	1.68	185.38	***
Scalar G2 (C)	467.03	242	.96	.96	.05	1.60	133.66	***
Scalar G3 (C)	440.64	240	.96	.96	.04	1.53	103.71	***
Scalar G4 (C)	403.91	238	.97	.97	.04	1.45	58.48	**
Scalar G5 (C)	392.01	235	.97	.97	.04	1.42	40.71	.11
Configural (V)	377.84	198	.97	.96	.05	1.40		
Metric (V)	379.55	204	.97	.96	.05	1.41	4.16	.65
Scalar (V)	508.82	244	.95	.95	.05	1.65	147.56	***
Scalar G2 (V)	482.37	242	.96	.96	.05	1.60	116.00	***
Scalar G3 (V)	456.74	240	.96	.96	.05	1.54	85.87	***
Scalar G4 (V)	428.21	238	.96	.96	.04	1.48	49.65	*
Scalar G5 (V)	421.06	237	.97	.96	.04	1.46	40.31	.17

Race Models	Goodness-of-fit Statistics						Model Comparison	
	χ^2	df	CFI	TLI	RMSEA	WRMR	$\Delta\chi^2$	<i>p</i> value
Configural (C)	386.24	198	.96	.95	.05	1.45		
Metric (C)	389.05	204	.96	.96	.05	1.46	4.80	.56
Scalar (C)	474.00	244	.95	.95	.05	1.61	95.58	***
Scalar R2 (C)	451.25	242	.96	.96	.05	1.56	69.42	**
Scalar R3 (C)	445.77	241	.96	.96	.04	1.55	62.83	**
Configural (V)	418.64	198	.96	.95	.05	1.48		
Metric (V)	419.90	204	.96	.95	.05	1.50	3.66	.72
Scalar (V)	541.42	244	.94	.94	.06	1.70	143.60	***
Scalar R2 (V)	503.86	242	.95	.95	.05	1.63	98.34	**
Scalar R3 (V)	484.13	240	.95	.95	.05	1.60	69.31	**
Scalar R4 (V)	461.60	238	.96	.96	.05	1.54	39.97	.22

Note. (C) denotes Calibration Sample ($n = 695$), (V) denotes Validation Sample ($n = 665$).

$\Delta\chi^2$ reports the difference in chi-square generated by the DIFFTEST option in Mplus adjusted appropriately for WLSMV estimation.

*** $p < .001$, ** $p < .01$, * $p < .05$

Primary Analyses

Primary analyses were defined by three sets of hypotheses: (a) hypotheses that explored direct effects, (b) hypotheses that explored indirect or mediated effects, and (c) hypotheses that explored whether gender and race moderated the structural relations in the model. In response to findings indicative of partial measurement invariance, this study tested multigroup SEMs, one for gender and one for race, to evaluate the nature of the structural relations in the model. Syntax was added to represent unique threshold noninvariance and the covariates SES and Prior Achievement prior to the estimation of the full structural models. Commands for complex data and stratification were utilized to account for students nested within schools. The fit of the full model, inclusive of measurement and structural components, was evaluated with the goodness-of-fit indices applied in CFA. In addition, the path coefficients that represented associations between latent variables were examined for magnitude and significance.

Structural paths (see Figures 4 through 7) depicted a direct association and indirect or mediated relations between the schools' social contexts and adolescents' engagement with schooling. ASC and SSC represented mediators in the model. Mediators have been defined as mechanisms through which variables exert influence on other variables (Baron & Kenny, 1986). Mediation was assessed with the Model Indirect command in Mplus. After significant direct and indirect effects were identified in the two multigroup models, two subsequent models were estimated to test for moderation.

The results of the constrained models evaluating moderation or structural invariance across groups defined by gender and race respectively are presented first followed by a summary of the structural path coefficients in the gender and racial models. Mplus reports

two-tailed p values associated with the significance of path estimates. Because this study hypothesized directional links between latent constructs, p values associated with the significance of path coefficients have been adjusted to reflect directional hypotheses.

Moderation in the Model

Multigroup models were estimated to test for moderation first by gender, and then racial group membership. In addition to default constraints and parameter constraints that accounted for partial scalar invariance, all structural paths across respective groups were constrained to equality. Results indicated that gender and race respectively did not exert statistically significant influences on the associations in the model. In other terms, the model appears to work similarly regardless of gender or racial group membership.

In the gender model, the chi-square difference between the baseline model (structural paths free to vary across groups) and the constrained model was not statistically significant (DIFFTEST, $p = .12$). This result indicated that the structural paths in the model did not differ significantly by gender group membership. The process of estimation and comparison of the baseline and constrained models was repeated with the cross-validation sample. This model produced comparable results (i.e., DIFFTEST was nonsignificant, $p = .71$). In the racial model, the chi-square difference between the baseline model and the constrained model was not statistically significant ($p = .52$). This finding indicated that the structural paths in the model did not differ significantly by racial group membership. This result was supported in the cross-validation sample ($p = .28$).

Results for the Gender Model

The multigroup model represented by Figures 4 and 5 was fitted initially to the calibration sample data. Mplus default constraints for multigroup models were employed,

with the exception of the nine threshold constraints released to account for the pattern of partial scalar gender invariance that characterized the measurement model estimated in the calibration sample. The model produced the following results for chi-square and goodness-of-fit indices: $\chi^2 = 479.30$ with 295 degrees of freedom, $n = 665$ (girls' contribution to $\chi^2 = 217.89$, boys' contribution to $\chi^2 = 261.41$); CFI = .96; TLI = 0.95; RMSEA = .05 with 90% CI of .04 to .05; and WRMR = 1.50.

Direct effects. Evaluation of path coefficients, which signify the direction and strength of relations between the latent factors in the model, suggested possible differences associated with gender group membership. Except for the structural path linking SC with ASC ($p = .13$), all path estimates for the girls' group were significant at $\alpha = .05$. The pathways that represented associations between SC and SSC, between SSC and ASC, and between ASC and ENG were significant at the $p < .01$ level. The paths linking SC to ENG and SSC to ENG were significant at the $p < .05$ level. For the boys' group, two path estimates were nonsignificant: The pathway between SC and SSC approached significance at the $p < .05$ level ($p = .08$), while the pathway that linked SSC with ENG was clearly nonsignificant ($p = .27$). Because one path estimate approached significance at $\alpha = .05$, and because sampling error is more likely to occur with smaller frequency counts, all pathways in the model were maintained for cross-validation procedures.

Indirect effects. Analyses were conducted to evaluate three specific indirect or mediating effects. The first hypothesized indirect effect suggested the influence of SC on ENG would be mediated through the latent factor ASC. The p value associated with this indirect effect was nonsignificant for both groups. However, the path coefficient did approach significance at the $p < .05$ level for the boys' group ($p = .08$). The second

hypothesized indirect effect posited the influence of SC on ENG would be mediated through the latent factor SSC. The p value associated with this indirect effect was significant ($p = .02$) only for girls. The third and final proposed indirect effect hypothesized the influence of SC on ENG would be mediated through ASC, which in turn would be mediated through SSC. This indirect effect also proved to be significant ($p = .01$) only for girls.

Cross-validation of path estimates. Estimation of the model in the validation sample produced the following results: $\chi^2 = 490.40$, $df = 297$, $n = 665$ (girls' contribution to $\chi^2 = 245.28$, boys' contribution to $\chi^2 = 245.11$); CFI = 0.95; TLI = 0.95; RMSEA = 0.05 with a 90% CI of .04 to .06; and WRMR = 1.47. The model represented an acceptable fit to the cross-validation sample data. While estimation of the gender model in the cross-validation sample produced similar results for chi-square and goodness-of-fit indices, the exact pattern of significant direct and indirect effects found in the calibration sample was not replicated in the cross-validation sample.

SEM Results for the Race Model

The multigroup model presented in Figures 6 and 7 was estimated in the calibration sample. Except for three threshold constraints that were relaxed to reflect findings of partial scalar invariance across racial groups, default constraints for multigroup models in Mplus were maintained. The model produced the following results: $\chi^2 = 520.62$ with 301 degrees of freedom, $n = 695$ (African American contribution to $\chi^2 = 254.23$, White contribution to $\chi^2 = 266.38$); CFI = .948; TLI = .947; RMSEA = .053 with 90% CI of .04 to .06; and WRMR = 1.57.

Direct effects. Path estimates for the African American group showed all direct associations between latent variables to be statistically significant. Associations between SC

and SSC, between SC and ENG, between SSC and ASC, and between ASC and ENG were significant at the $p < .01$ level, while associations between SC and ASC and between SSC and ENG were significant at the $p < .05$ level. In the White group, parameter estimates revealed no structural pathways to be significant at the $p < .01$ level, and only one pathway (SC to SSC) was statistically significant at the $p < .05$ level. Of the remaining five structural paths in the model, four approached significance at the $p < .05$ level with p values ranging from .06 to .08. This finding and the likelihood that small cell sizes (particularly in the White group) contributed to sampling error, supported the decision to maintain all pathways in the originally hypothesized model for estimation in the cross-validation sample.

Indirect effects. The indirect effect of SC on ENG working through ASC did not reach statistical significance at $\alpha = .05$ in either the African American ($p = .06$) or White ($p = .13$) group. The hypothesized indirect effect of SC on ENG mediated through SSC was significant at the $p < .05$ level in the African American group ($p = .04$) but failed to reach statistical significance in the White group ($p = .14$). Similarly, the indirect effect of SC on ENG mediated by ASC and SSC was significant ($p = .02$) only for the African American group.

Cross-validation of path estimates. The multigroup racial model was estimated in the cross-validation sample. With the exception of threshold constraints that freed to account for partial scalar invariance, default constraints were maintained. Estimation in the cross-validation sample produced a covariance matrix for the White group that was not ‘positive definite’. Therefore, the structural path estimates for the model defined by racial group membership could not be cross-validated as originally proposed.

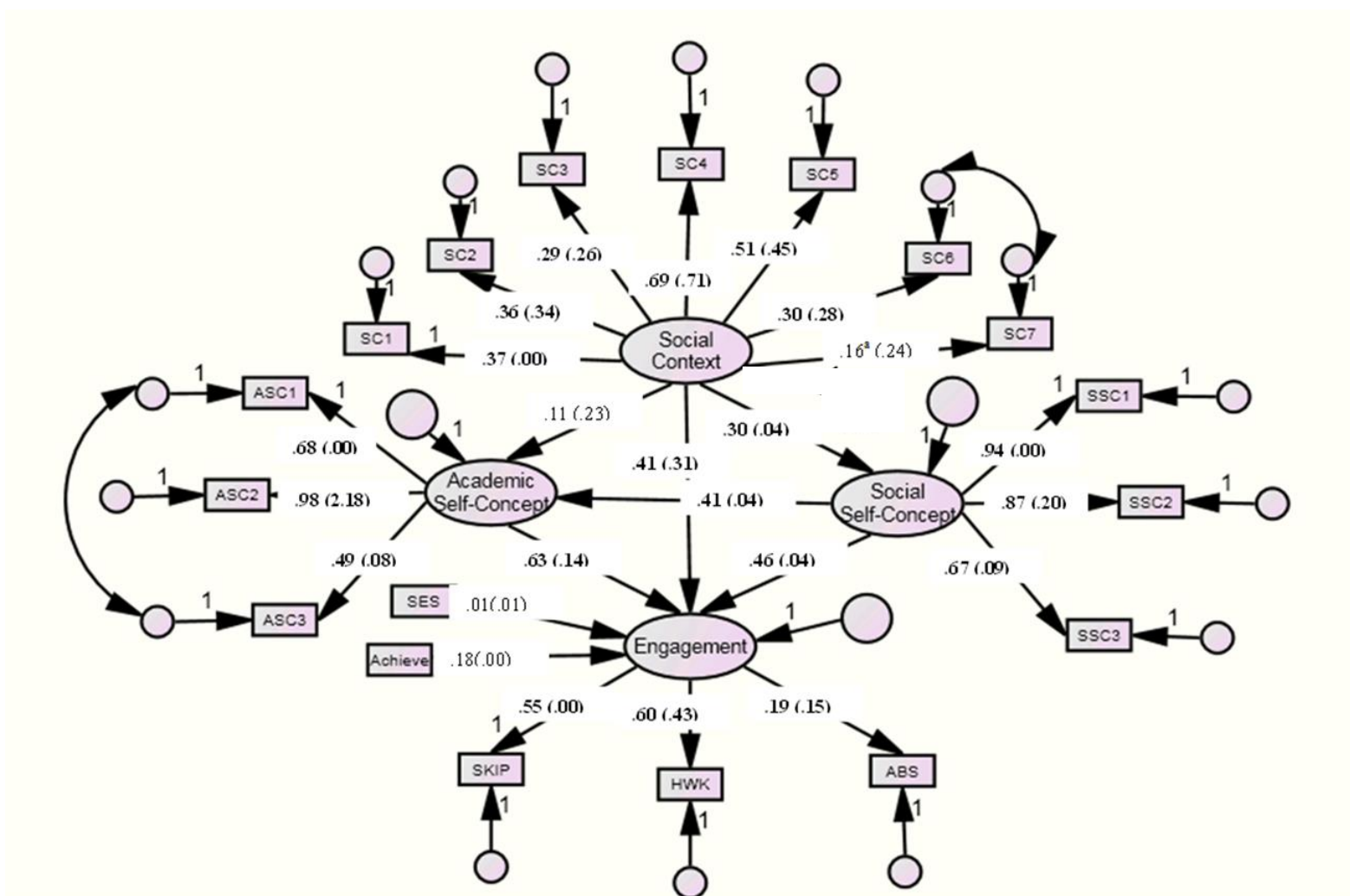


Figure 4. Results of the full model for adolescent girls. Bold font signifies parameter estimates that were significant in the calibration sample and in post hoc analyses. =Standardized estimates followed by standard errors (in parentheses) are reported. Superscripted parameters approached significance with $p > .05$ but $\leq .08$. Correlations between latent variables are not depicted.

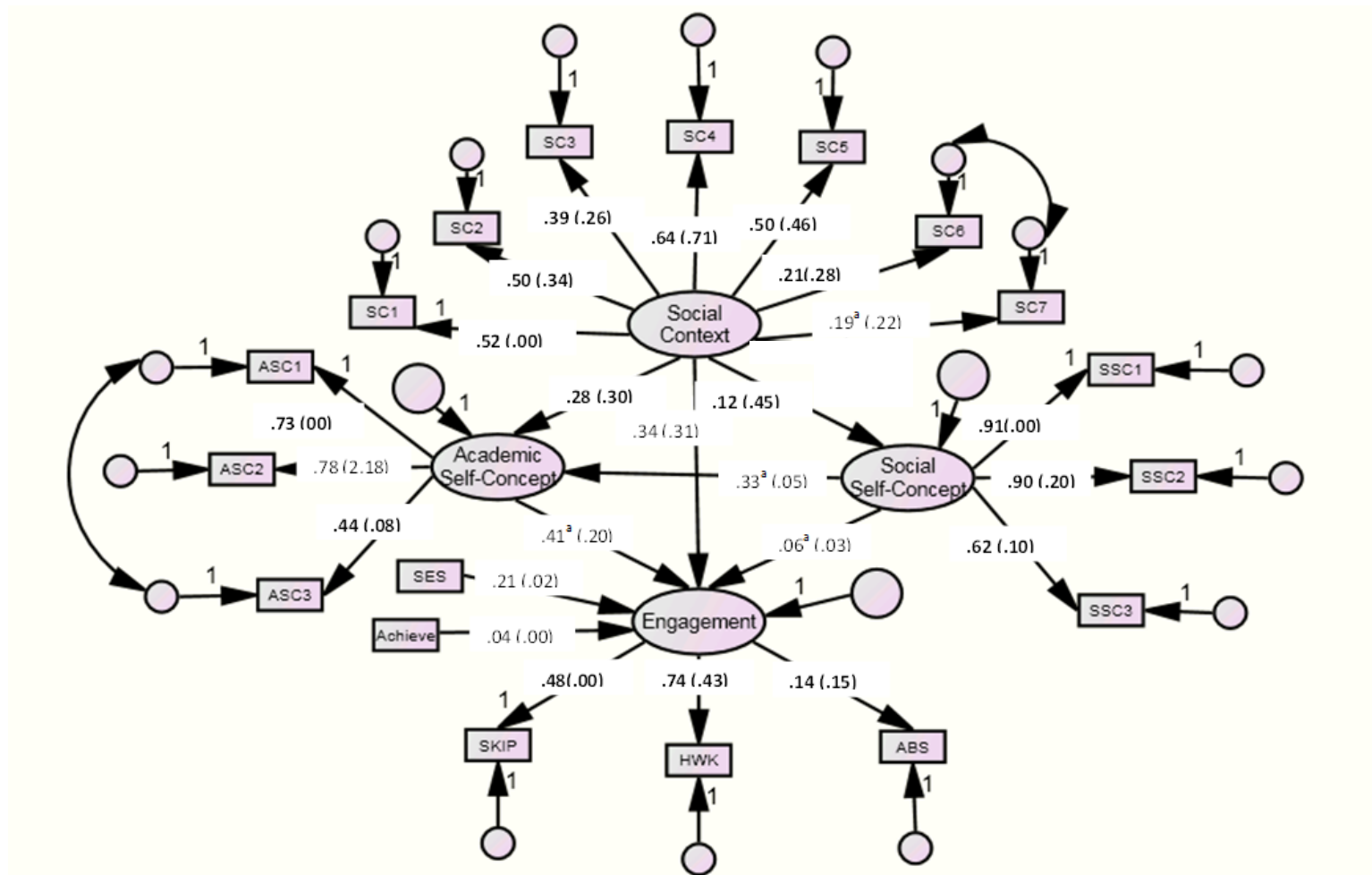


Figure 5. Results of the full model for adolescent boys. Bold font signifies parameter estimates that were significant in the calibration sample and in post hoc analyses. Standardized estimates followed by standard errors (in parentheses) are reported. Superscripted parameters approached significance with $p > .05$ but $\leq .08$. Correlations between latent variables are not depicted.

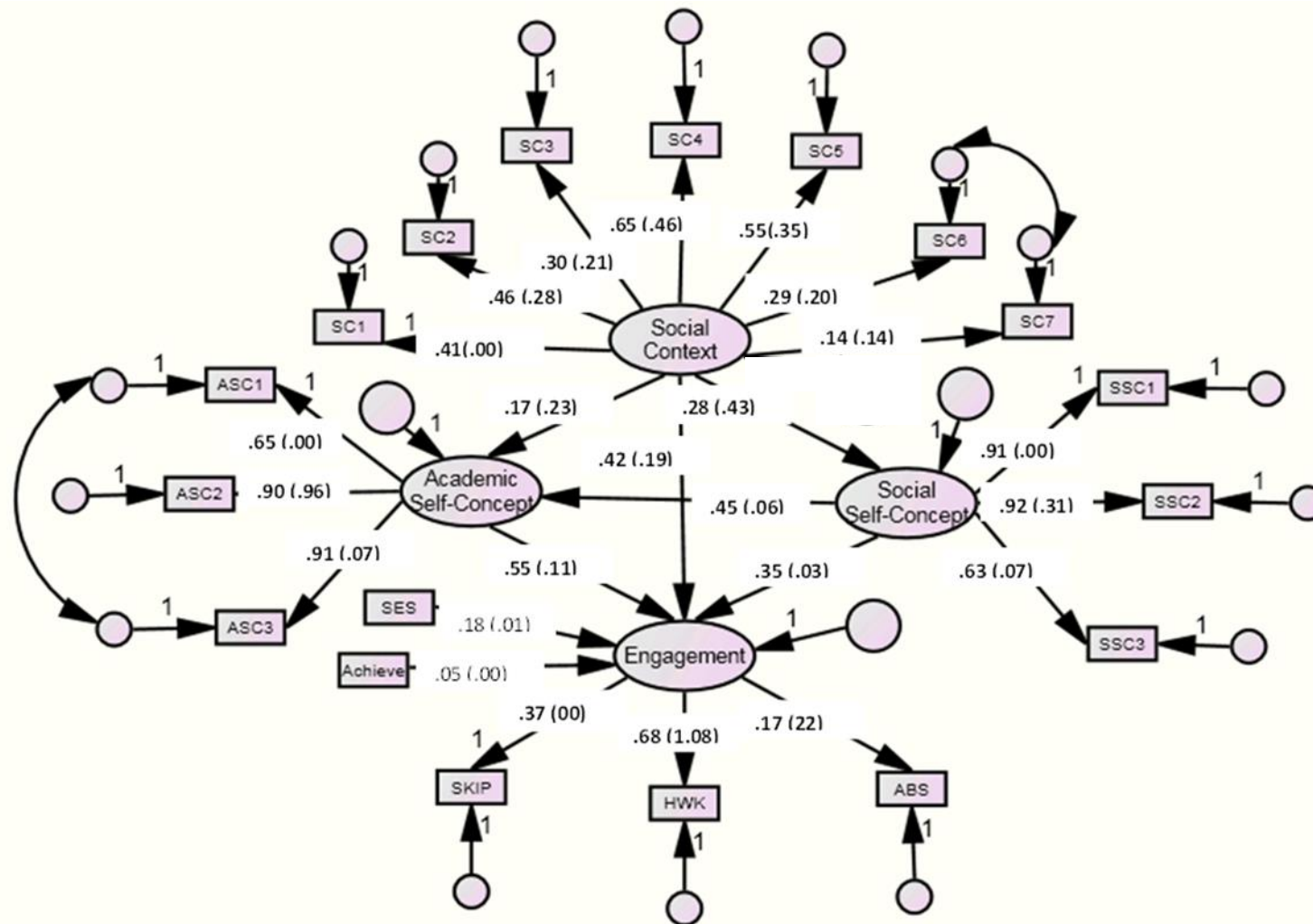


Figure 6. Results of the full model for African American adolescents. Bold font signifies parameter estimates that were significant in the calibration sample and in post hoc analyses. Standardized estimates followed by standard errors (in parentheses) are reported. Correlations between latent variables are not depicted.

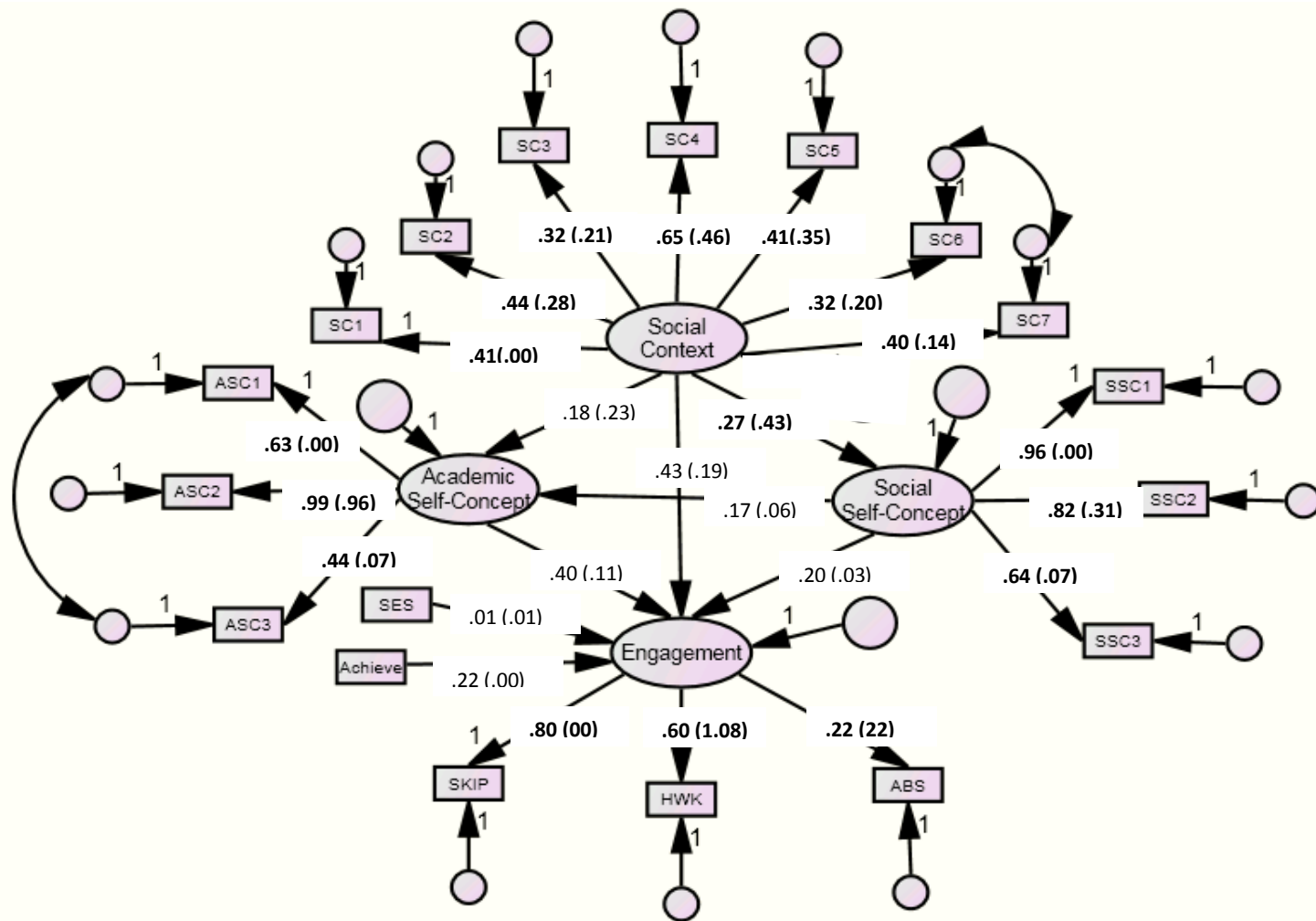


Figure 7. This figure depicts the full model for White adolescents. Bold font signifies parameter estimates that were significant in the calibration sample and in post hoc analyses. Standardized estimates and standard errors (in parentheses) are reported. Correlations between latent variables are not depicted.

Post Hoc Analyses

Attempts to employ the split-sample method of cross-validation to the full structural models were defensibly ineffective. In the gender model, the calibration and validation samples produced a different pattern of significant direct and indirect effects. Where race was concerned, estimation of the model in the cross-validation sample produced a not positive definite covariance matrix. In light of these issues, a third random sample (V2) was drawn in support of the attempt to cross-validate SEM results. Descriptive statistics and information pertaining to measurement invariance for sample V2 are presented in Appendix B.

The gender model estimated with the V2 sample produced the following results: $\chi^2 = 505.29$ with 296 degrees of freedom, $n = 665$; CFI = 0.94; TLI = 0.94; RMSEA = 0.054 with 90% CI of .04 to .06; and WRMR = 1.518. Although the results demonstrated a small decrease in overall model fit, estimation of the model in the second cross-validation sample produced the exact pattern of significant direct and indirect effects produced in the calibration sample. Table 4.5 summarizes the patterns of significant direct and indirect effects produced by estimation of the gender model in the calibration, validation, and V2 samples. The results of the racial model estimated with the V2 sample were: $\chi^2 = 541.81$ with 298 degrees of freedom, $n = 665$; CFI = 0.93; TLI = 0.93; RMSEA = 0.05 with 90% CI of .05 to .06; and WRMR = 1.58. Estimation of the model defined by racial group membership produced evidence of a decrease in overall model fit. However, the pattern of significant direct and indirect effects found in the calibration sample was largely reproduced in V2. Table 4.6 summarizes significant direct and indirect effects estimated in the calibration and V2 samples for the model defined by racial group membership.

Table 4.5

P values of Path Estimates in Gender Model for Calibration, Validation, and V2 Samples

	Calibration		Validation		V2	
<u>Direct effects</u>						
	Girls	Boys	Girls	Boys	Girls	Boys
SC → ASC	.124	.038	.011	.226	.200	.042
SC → SSC	.002	.015	.004	.017	.000	.025
SSC → ASC	.00	.08	.00	.00	.00	.06
ASC → ENG	.01	.05	.01	.05	.01	.08
SSC → ENG	.00	.052	.01	.06	.00	.08
SC → ENG	.01	.27	.17	.15	.01	.24
	Calibration		Validation		V2	
<u>Indirect effects</u>						
	Girls	Boys	Girls	Boys	Girls	Boys
SC → ASC → ENG	.13	.08	.04	.23	.19	.10
SC → SSC → ENG	.02	.30	.18	.17	.02	.26
SC → SSC → ASC → ENG	.01	.13	.03	.06	.01	.12

Note. Significant path estimates at the $p < .05$ level are depicted in bold font.

Table 4.6

P values of Path Estimates in Racial Model for Calibration and V2 Samples

	Calibration		V2	
<u>Direct effects</u>				
	AfAm	White	AfAm	White
SC → ASC	.03	.10	.05	.10
SC → SSC	.00	.03	.00	.03
SSC → ASC	.00	.06	.00	.15
ASC → ENG	.00	.07	.00	.10
SSC → ENG	.02	.090	.02	.12
SC → ENG	.01	.07	.01	.14
	Calibration		V2	
<u>Indirect effects</u>				
	AfAm	White	AfAm	White
SC → ASC → ENG	.06	.13	.12	.11
SC → SSC → ENG	.04	.14	.03	.14
SC → SSC → ASC → ENG	.02	.14	.01	.20

Note. Significant path estimates at the $p < .05$ level are depicted in bold font.

Summary of SEM Results

Due to findings that indicated measurement noninvariance, SEM analyses were conducted on multigroup models defined by gender and race, respectively. Analyses revealed possible group differences in factors proposed to influence adolescents' engagement with schooling. For girls, three latent variables (Social Context, ASC, and SSC) had significant direct effects on the outcome student engagement. Findings for boys differed slightly: Although SC and ASC were evidenced to have significant direct effects on student engagement, SSC did not exert a significant direct influence on ENG. Indirect effects signifying mediation, or the process by which one variable exerts influence on another, also appeared to differ by gender. For girls, SSC emerged as a significant mediator of the association between SC and ENG. When considered singularly, ASC did not appear to mediate the relation between SC and ENG. However, ASC did exert a significant indirect or mediated effect on ENG when regressed on SSC, which in turn was regressed on SC. For boys, no evidence was found to suggest that ASC or SSC mediated the influence of SC on ENG.

The model defined by race also produced results suggestive of group differences. Equivalent to the finding for girls, for African Americans all three latent variables exerted a significant direct effect on the outcome engagement. In the White group, no evidence suggested that SC, ASC, or SSC exerted a significant direct effect on student engagement. In regards to mediation, for the African American group, SC did appear to exert influence on ENG through the latent variable SSC. As was the case for girls, ASC did not significantly mediate the relation between SC and ENG when considered singularly. However, ASC did appear to mediate the relations between SC and ENG when SSC was added to the regression equation as a mediator between SC and ASC (i.e., ENG on ASC on SSC on SC). As was the

case for boys, for White students, neither ASC nor SSC significantly mediated the relation between SC and ENG.

Broadly considered, the results of the study demonstrated inconsistent support for the study's hypotheses. First, estimation of the multigroup models provide varied support for the hypothesis that students' perceptions of the social context of schooling would be significantly related to behavioral measures of engagement. This hypothesis held true in groups comprised of girls and African American youth, respectively. The second hypothesis posited social self-concept of ability beliefs would be related to academic self-concept of ability beliefs. This hypothesis also held true only for girls and African American youth respectively, although the structural pathway representing this relationship approached statistical significance for boys. Results did not produce evidence of mediation at the model level in any of the four groups studied. However, results generated some support for hypotheses that posited specific indirect effect. Here again, support for hypotheses varied in accordance with gender and racial group membership. For girls and African American adolescents, SSC mediated the association between SC and ENG and SSC mediated the relation between SC and ASC. Regardless of evidence that suggested a different pattern of significant pathways in the multigroup structural models, results of analyses did not support the hypotheses that gender and race would moderate the structural relations in the proposed model.

CHAPTER 5: DISCUSSION

This dissertation employed MADICS (Eccles, 1997) Wave 1 data to evaluate a model of student engagement informed by the Self-Systems Model of Motivational Development ([SSMMD] Connell, 1990; Connell & Wellborn, 1991; Skinner & Wellborn, 1994). Drawing on this framework, the hypothesized model emphasized links between the school's social context, motivational beliefs, and adolescents' school engagement. More specifically, it highlighted the mediating roles of social and academic self-concept of ability beliefs between students' perceptions of context and behaviors indicative of school engagement. Existing theory and research informed the model put forth here. However, the model was somewhat distinct in that it tested the association between social and academic self-concept of ability beliefs in regards to influence on student engagement.

Key findings indicated varying support for the model as evidenced by differences in model fit and results between groups defined by gender and race, respectively. For this sample of adolescents, the model more accurately reflected the experiences of adolescent girls and African American youth. Findings also confirmed the importance of evaluating measurement invariance in culturally and/or demographically heterogeneous samples. The remainder of this chapter discusses the major findings of SEM analyses, highlights implications of the study's findings for future research and practice, and outlines the study's major limitations.

A Self-Systems Model of Student Engagement

The primary goal of this study was to provide insight into whether adolescents' social

and academic self-concept of ability beliefs act as mechanisms through which perceptions of the school's social context influence student engagement. This question reflects the self-systems perspective expressed by the SSMMD which emphasizes self-appraisals of ability as psychological processes that mediate the association between perceptions of a particular context and subsequent behaviors or actions within that context (Connell & Wellborn, 1991). This view of human development supported the underlying premise of this study that adolescents who hold positive perceptions of the school's social context (i.e., social support and school climate) are more likely to develop positive social and academic self-concept of ability beliefs and subsequently express higher levels of behaviors indicative of student engagement (Skinner et al., 2009).

Preliminary findings of measurement noninvariance across groups conveyed the need to employ multigroup analyses. Analyses at the model level suggested a reasonable fit to data partitioned into groups defined by gender and race, respectively. The broader pattern of results produced in estimation of the two multigroup models demonstrated inconsistent support for the study's hypotheses. The following section discusses findings related to mediation. Discussion emphasizes total indirect effects used to determine whether there was evidence of mediation at the model level and specific indirect effects associated with the three unique mediated pathways represented in the model.

Mediation in the Model

Total indirect effects. At the model level results did not demonstrate evidence of mediation. Estimation of the multigroup models did not show significant total indirect effects for any group represented in analyses (girls and boys, African Americans and Whites). This was unexpected in that theoretical and empirical support exists for

associations between social context (SC) and self-concept of ability beliefs and between self-concept of ability beliefs and school engagement (Ahmed et al., 2010; Connell & Wellborn, 1991; Danielsen et al., 2011; Eccles & Midgley, 1989; Skinner et al., 2009). Several factors may have contributed to these seemingly oppositional findings.

First, due to patterns of skewness and kurtosis indicative of nonnormality, the data were treated as categorical and a weighted least squares (WLS) method of model estimation was employed. Although WLS arguably represented the most appropriate choice of estimators for the data used in this study, it has proven to be less effective at finding significant effects when compared to more widely applied maximum likelihood techniques. A second possible factor that may have contributed to results that were inconsistent with existing literature is that this study evaluated a model defined by multiple mediators. Preacher and Hayes (2008) note diminished parameter estimates for indirect effects in models with multiple mediators. Another possible explanation relates to the racial composition of the sample (approximately 66% African American). Many of the participating schools served communities comprised largely of African American families. Studies have shown that schools characterized by student populations that are largely African American tend to have distinctive characteristics that can exert different patterns of influence on student development (Rowley et al., 2010). One additional factor should be noted. The estimated scale reliability for the latent variable student engagement was below recommendations for acceptable scale reliability (George & Mallery, 2003). It is possible that the negative findings related to mediation at the model level reflected an inability of the selected items to accurately reflect the construct student engagement. Although no significant total indirect effects were identified, analyses provided evidence of a diverse array

of specific indirect or mediated effects associated with group membership.

Specific indirect effects. Three unique structural pathways that represented mediational hypotheses were evaluated. The first pathway posited ASC as a mediator in the association between perceptions of the schools' social context and student engagement. Evidence indicated that with socioeconomic status (SES), prior achievement, and a second mediator SSC accounted for in the model, ASC did not mediate the association between students' perceptions of the school's social context and engagement. This result was consistent across all groups.² Generally speaking, these findings are inconsistent with previous literature. Marchand and Skinner (2007) found evidence that academic self-concept of ability beliefs fully mediated the association between perceptions of social support within the school context and behaviors indicative of engagement. Similarly, Chouinard, Karsenti, and Roy (2007) and Patrick, Ryan, and Kaplan (2007) found evidence that self-concept of ability beliefs mediated the association between school-based social support and student engagement. In light of the racial composition of the sample used to complete this dissertation study, it is worthwhile to note that the negative findings related to ASC as a mediator between social context and engagement were consistent with results of previous studies focused on Latino and African American youth (Bouchey & Harter, 2005; Tucker et al., 2002).

A second pathway in the proposed model hypothesized SSC as mediating the association between the school's social context and student engagement. This indirect effect was significant only for adolescent girls and for African American youth. For girls and African American adolescents, social self-concept of ability beliefs provided a form of

² The *p* value associated with this specific indirect effect did approach significance at the level of $\alpha = .05$ for adolescent boys ($p = .08$) and African American youth ($p = .06$).

support that contributed to expressions of student engagement. These findings are consistent with limited research that has examined social self-concept of ability beliefs as mechanisms linking students' perceptions of the school contexts with behaviors indicative of engagement (Patrick et al., 2007; Wang, 2009). Wang's study (2009), also conducted with MADICS data, demonstrated the mediating role of social self-concept of ability beliefs between perceptions of teacher support and deviant behaviors indicative of a lack of student engagement. Similarly, Patrick, Ryan, and Kaplan (2007) found that social self-concept of ability beliefs fully mediated the association between peer support and task-related interactions that characterized student engagement. The pattern of findings reported here, coupled with the gap in existing literature, suggest the mediating role of SSC as a potentially fruitful area for future research.

The third and final pathway that defined a mediated association in the proposed model posited SSC as a mediator in the association between SC and ASC which in turn was posited to predict engagement. A literature search revealed no evidence that this association had been directly evaluated. The decision to hypothesize a relationship between social and academic self-concept of ability beliefs emanated from conclusions made by Wentzel and Wigfield (1998) in a summary of literature on the intersection of academic and social motivational influences. The authors state "ways in which students integrate and coordinate academic and social concerns has a powerful impact on their academic success at school." (p. 156) Wentzel (2010) identifies self-regulatory skills as skills that support the development of social competence. These same skills have been identified as a support system that contributes to the development of academic competence (Zimmerman & Kitsantas, 2007). Drawing on the assumption that social and academic competence develop from a common

set of skills, it is plausible to theorize a link between students' social and academic self-concept of ability beliefs. Two factors shaped the decision to conceptualize the direction of influence between these constructs as moving from social to academic. First, seminal cognitive theories (e.g., Piaget, 1983; Vygotsky, 1978) recognize intellectual development as having roots in social interaction. Second, as social relations are particularly influential during adolescence, positing the direction of influence between the two constructs from social to academic was deemed reasonable.

The specific indirect effect that posited ASC mediating the association between SSC and student engagement was significant only for girls and African American youth, respectively. Although evidence did not support mediation of the association between the school's social context and engagement by ASC, subsequent findings demonstrated that for some students, under certain circumstances, it did exert a mediating influence on engagement. For girls and for African American youth, ASC worked in concert with SSC to shape the nature of the relations between adolescents' perceptions of the school's social context and behaviors indicative of engagement. This finding and the unexplored interplay between social and academic self-concept of ability beliefs as an influence on adolescents' school engagement indicates the need for additional research focused on these relations.

Summary of mediation. Overall, findings indicated inconsistent support for mediational hypotheses. For the sample studied here, there was no evidence of mediation at the overall model level. However, for girls and African American youth, findings of significant specific indirect effects (i.e., SSC singularly, and SSC in concert with ASC) supported the characterization of ASC and SSC as mechanisms through which the school's social context influences student engagement. A similar pattern of findings held true for

hypotheses that posited direct associations between SC and engagement and between SSC and ASC. To curtail redundancy, a discussion of how this study's findings relate to previous literature on gender, race, and school motivation follows as part of the discussion of findings related to the evaluation of direct effects in the hypothesized model.

Direct Effects in the Model

The influence of social context on engagement. An impressive body of literature that emphasizes social perspectives on motivational processes in education has been developed (e.g., Juvonen, 2006; Skinner et al., 2009; Wentzel & Wigfield, 2007). Across diverse theoretical perspectives, studies demonstrate significant associations between students' perceptions of the social context of schooling and behaviors indicative of engagement (e.g., Anderman et al., 2011; Benner et al., 2008; Van Ryzin, 2011; Wang et al., 2010; Wentzel et al., 2010). This study found a statistically significant, positive, and direct association between social context and student engagement for adolescent girls and for African American youth. However, these findings did not hold true for boys and White youth, respectively. This pattern of findings reflects conclusions advanced by studies on the importance of school-based social relations for the school performance of girls and minority youth (Crosnoe et al., 2004; Eccles, 1994; Goodenow, 1993; Parsons, Kaczala, & Meece, 1982; Shin, Daly, & Vera, 2007; Smalls, White, Chavous, & Sellers, 2007; Wong Eccles, & Sameroff, 2003).

Girls. Although the social context of schooling represents an important developmental context that contributes to boys' school engagement (Bleach, 1998; Connell, 1996; Furrer & Skinner, 2003; National Research Council and Institute of Medicine, 2004; Noble & Bradford, 2000), in this study social processes exerted greater influence on the

school engagement of girls. This may relate to the fact that the data analyzed to complete this study were collected in junior high schools prior to enactment of major educational reforms in the 1990s based on post-Title IX research and policy initiatives. Reforms resulted in the replacement of junior high schools with middle schools structured in part to enhance social relations within schools as one means of supporting the educational achievement of girls. Early gender research suggested that girls were more likely to define themselves in terms of relationships (Belenky et al., 1986; Gilligan, 1982), and that academic success had a social cost for girls in terms of peer popularity. Applied to current findings, if girls experienced junior high schools as limiting or discriminatory on the basis of gender, perceptions of support, belonging, and the availability of warm caring individuals might account for the heightened motivational role played by social relations in the school engagement of the adolescent girls studied here. Performance indicators suggest girls have made significant educational gains following decades of research and educational reforms geared toward disrupting educational practices identified as detrimental to the school engagement and achievement of female students (Meece & Askew, 2011). In addition, data indicate that boys are beginning to lag behind girls in course grades, enrollment in advanced math and science coursework, and college enrollment and degree attainment (Corbett, Hill, & Rose, 2008; NCES, 2009; Roderick, 2003). The knowledge that school environments will continue to evolve in response to shifting sociocultural conditions, alongside recognition that boys are more likely to become disengaged with schooling, suggests that ongoing research on the intersection of gender, social processes, and school motivation and engagement is warranted.

African American youth. Estimation of the model also reflected differences

associated with racial group membership. Social context exerted a statistically significant direct influence on student engagement for African American youth. This result did not hold true in the data provided by White adolescents. The SSMD (Skinner et al., 2008; Skinner & Pitzer, 2012) identifies contextual variables as influences on students' motivation and engagement. Bingham and Okagaki (2012) posit this might be particularly true for racial and ethnic minority students who often navigate culturally rich and complex social worlds.

First, feelings of discontinuity can develop when African American youth participate in school settings that reflect majority values and practices markedly different from norms experienced at home and in community (Tyler et al., 2008). This is not to say that African Americans represent a homogenous group with a single set of cultural values and practices (Gutierrez & Rogoff, 2003). However, scholars support the premise that successful participation in the public school system in the U.S. is somewhat dependent on an individual's ability to express orientation toward majority culture (American Psychological Association, 2003; Constantine & Sue, 2006; Rogoff, 2003). Boykin and colleagues have identified communalism, movement, and verve as (Boykin, 1983; Boykin & Allen, 1988) as key values characteristic of African American culture. Subsequent studies have demonstrated a positive association between the school-related outcomes of low-income African American children and adolescents and learning tasks characterized by these cultural values (Bailey & Boykin, 2001; Boykin & Cunningham, 2001; Boykin, Lilja, & Tyler, 2004; Ladson-Billings, 2001; Neal, McCray, Webb-Johnson, & Bridgest, 2003). In this study, the school's social context directly and indirectly influenced African American students' school engagement. The fact that many of the African American adolescents who participated in the original MADICS study attended schools serving primarily African American neighborhoods

might have minimized the experience of cultural discontinuity thus creating a situation in which the social context of the school was indeed a significant source of support contributing to motivation and engagement. As numerical minorities in many of the schools in this sample, White adolescents may have been more likely to experience a sense of discontinuity in regards to the school's social context. If this was the case, feelings of discontinuity may have contributed to the nonsignificant association between White adolescents' perceptions of the school's social context and behaviors indicative of engagement. Additionally, White students who attended schools with limited access to same-race/ethnic group may have been less inclined to become fully engaged within the school context (Ueno, 2009).

Next, some scholars have considered the school motivation and engagement of African American students through a lens focused on stereotyped or racialized messages potentially communicated in ecological settings such as schools (Fordham & Ogbu, 1986; Steele, 1997; Hudley & Graham, 2001). The experience of being embedded in schools where the majority of students were African American may have minimized negative perceptions of the social context and shaped a peer culture tolerant and/or supportive of academic success. Researchers have begun to challenge a longstanding view of a peer culture that discourages academic success among African American youth (Hamm, Lambert, Agger, & Farmer, 2013; Tyson, Darity, & Castellino, 2005; Walker, 2006). Studies have shown that African American youth do not pay a social cost and in some instances earn peer respect for academic success (Tyson et al., 2005; Walker, 2006). Other studies have indicated that African American youth navigate the interface of academic success and peer culture by creating supportive intellectual communities within larger peer networks (Horvat & Lewis, 2005; McLaughlin & Jones, 2009). In these instances, shared academic interests

provide a source of encouragement and a resource toward building academic competence (Walker, 2006). Hamm and colleagues (2013) highlighted the role of academically promotive peer contexts on the school adjustment of African American boys. Their findings demonstrated a connection between sustained participation in promotive social networks and enhanced academic adjustment. As a group, the studies cited in this section provide reasonable insights into why African American students' perceptions of the school's social context in contrast with White students' perceptions of the school's social context played a more influential role in shaping behaviors indicative of school engagement.

The influence of social self-concept of ability beliefs on academic self-concept of ability beliefs. Gender and racial differences also characterized the direct association between social and academic self-concept of ability beliefs. Here again, a statistically significant association was evidenced only for adolescent girls and African American youth, respectively.³ Where there are well-defined theoretical perspectives that can be employed to interpret patterns of gendered and racialized findings associated with mediated pathways in the model, there is a notable absence of theoretical and empirical work that investigates relations between adolescents' social and academic self-concept of ability beliefs.

Gender. Research has produced broad insights into gender differences in ability-related beliefs. For example, early studies show domain specific gender differences with boys likely to report higher self-perceptions of competence in math, and girls likely to perceive stronger abilities in verbal and social domains (Eccles, Wigfield, & Schiefele, 1998; Fredricks & Eccles, 2002; Marsh & Young, 1998). The model evaluated here hypothesized the direction of influence moving from social to academic. The thought was that social self-

³ The pathway between SSC and ASC approached significance at the level of $\alpha = .05$ for adolescent boys ($p = .08$).

concept of ability beliefs would contribute to academic self-concept of ability beliefs. Interestingly, of the three items used to construct the latent variable ASC, two emphasized math-related ability beliefs. It is intuitively plausible that relatively strong competence beliefs in one domain (i.e., girls tend to perceive themselves as more competent in the social domain) might be leveraged to support competence beliefs in a second domain (i.e., girls tend to perceive themselves as less competent in math). Looking at this premise from the other side, there is little logic to the argument that weaker self-concept of ability beliefs in one domain (i.e. boys tend to perceive themselves as less competent in the social domain) could represent psychological capital to support relatively stronger self-concept of ability beliefs in a second domain (i.e., boys tend to perceive themselves as more competent in math-related activities). Stated concisely, gendered patterns of domain specific ability-related beliefs may have contributed to gendered findings regarding the association between social and academic self-concept of ability beliefs.

Literature on self-regulated learning offers an alternative lens for understanding why the association between social and academic self-concept of ability beliefs appears to be more pronounced for girls. Wentzel (2010) notes that the development of social and academic self-concept of ability beliefs are rooted in a common set of self-regulatory skills. As such, the development of social and academic competence would be linked to self-regulatory processes such as planning, goal setting, organizing, self-monitoring, help-seeking, and self-evaluation (Zimmerman, 1990). Zimmerman and Kitsantas (2007) point out that these processes involve dynamic interactions between individual characteristics and external demands. Self-regulation implies that in order to be successful at a task, an individual must integrate personal objectives and actions with the objectives and actions

defined by participation in a particular social context. Studies suggest girls are more likely to express characteristics associated with self-regulated learning (Cross, Copping, & Campbell, 2011; Else-Quest, Hyde, Goldsmith, & Van Hulle, 2006; Eschenbeck, Kohlmann, & Lohaus, 2007; Silverman, 2003). Perhaps the heightened role assigned to social relationships in womens' identity development (Belenky et al., 1986; Gilligan, 1982) represents a tool that can be used to more effectively navigate the space between personal and social demands which is required to fully enact self-regulatory processes to support achievement that informs academic self-concept of ability beliefs. Consider help-seeking, a self-regulatory strategy that has been linked with school engagement (Marchand & Skinner, 2007). Help-seeking is enacted when an individual initiates social interaction to facilitate feedback in order to enhance performance. As such help-seeking provides an initial opportunity to connect to others through social interaction and the subsequent opportunity to develop academic competence through these interactions. Here, the direction of influence flows from the social to the academic domain. If girls are more effective at enacting self-regulatory processes in social interactions these skills might then support the willingness of others to provide academic help or assistance with other academic demands like planning and organization which ultimately lead to increases in competence and academic self-concept of ability beliefs. Next, parallel explanations are explored as to why in this study a positive direct association between SSC and ASC was found only for African American in comparison to White youth.

Race. Graham and Hudley (2007) highlight the everyday life experiences and perceptions of people of color as a critical starting point for understanding motivational processes including the development of competence and self-concept of ability beliefs in

minority groups. They go on to note the widespread positioning of ethnic and racial minorities at the low end of social status hierarchies where “barriers to opportunity often override personal strivings for achievement.” (p. 393) Although racism and discrimination are less prevalent today, research continues to indicate lingering perceptions of African Americans as less intelligent than their White counterparts (Graham & Hudley, 2007). As noted in the discussion of gendered patterns of self-concept of ability beliefs, socially transmitted messages exert considerable influence on African American adolescents’ school motivation and engagement. For example, Steele (1997) found evidence of stereotype threat or a situation in which heightened awareness of the probability of racial discrimination, within the school context was associated with a decrease in African American students’ school engagement.

Consider two types of discriminatory messages racial and/or ethnic minority youth may encounter across years of schooling. A meta-analysis conducted by Tennenbaum and Ruck (2007) provides clear evidence that teachers hold lower expectations for success for African American students. Roeser and Eccles (1998) found that adolescents who perceived their teachers as believing in them as good students were significantly more likely to show increases in academic self-concept of ability beliefs two years later. Teachers’ expectations represent a key source of information students draw on in forming academic self-concept of ability beliefs. The literature also suggests that African American youth are more likely to perceive themselves to be the recipients of harsh discipline and other types of unfair treatment in school settings (Gregory, Skiba, & Noguera, 2010; Gregory et al., 2011). Studies also indicate an association between perceptions of unfair treatment and diminished academic motivation and engagement (Brand et al., 2003; Langhout & Mitchell, 2008).

Even though the literature outlines a number of ways that African American youth may be treated unfairly in schools, studies report that on average African American youth view themselves as capable learners (Greene & Way, 2005; Morgan & Mehta, 2004).

A more effective way to address the influence of social self-concept of ability beliefs on the academic self-concept of ability beliefs of African American youth in this study might be constructed around the notion of communalism. Research indicates that in comparison with other racial and/or ethnic groups, African American youth report stronger preferences for group work (Ellison, Boykin, Tyler, & Dillihunt, 2005), and demonstrate higher levels of academic achievement when working collaboratively (Dill & Boykin, 2000; Hurley, Boykin, & Allen, 2005). Hurley and colleagues (2005) studied the association between communalism and achievement within the context of math-related activities.⁴ They reported directionality of influence moving from the social to the academic domain. Coupled with the knowledge that actual achievement shapes academic self-concept of ability beliefs, communalism represents a means to interpret the heightened influence of social self-concept of ability on African American adolescents' academic self-concept of ability.

To summarize, tests of direct effects provided inconsistent support for the hypothesis that the social context of schooling exerted a direct influence on student engagement, and inconsistent support for the hypothesis that adolescents' social self-concept of ability beliefs would exert a direct influence on their academic self-concept of ability beliefs. The pathways in the model that represented direct effects were statistically significant only for girls and African American adolescents, respectively. Although gender and race represent distinctive areas of human experience, in the model evaluated here they appeared to exert parallel patterns of influence linking the social context of schooling to student engagement

⁴ This dissertation used measures of academic self-concept of ability that largely emphasized mathematics.

directly and through motivational processes represented by self-concept of ability beliefs. In some ways, the constructs used to make sense of patterns of findings overlap as well. The most basic explanation is derived from literature that posits social relationships playing a more influential role in the psychological development of girls and African American adolescents (e.g., Gilligan, 1982; Bingham & Okagaki, 2012). Another explanation relates to social beliefs, attitudes, and practices that can communicate negative messages to girls and African American adolescents regarding their capacity for achievement which then impacts motivation and engagement (e.g. Hyde & Durik, 2007; Tennenbaum & Ruck, 2007). Structural explanations such as school settings reflecting a junior high school model and the racial compositions of the schools comprising the MADICS sample may also contribute to patterns of findings associated with gender and race.

The sample employed in this study was primarily African American and only a small percentage of the research on school engagement has focused on the perceptions and experiences of racial and/or ethnic minority youth (Bingham & Okagaki, 2012). Additionally, there is almost no research that has looked at the nature of the association between social and academic self-concept which represented a critical component of the analyses conducted here. These factors represented challenges to the current work and present an exceptional opportunity for future scholarship. So far, the discussion has highlighted ways in which the model appeared to work differently across groups (girls, boys, African Americans, Whites). Although different pathways were found to be significant for girls and boys, and African Americans and Whites subsequent testing did not produce evidence of moderation by gender or race at the model level. These findings are discussed below.

Moderation in the Model

Although the pattern of significant pathways produced in estimation of the multigroup models appeared to suggest marked differences associated with gender and racial group membership, tests of moderation suggested that the model operated similarly for girls and boys, and for African American and White students, respectively. This seems unlikely as five out of the six structural pathways in the hypothesized model were statistically significant for girls in comparison with boys whose data when estimated produced only two statistically significant structural relations. Similarly, all six of the hypothesized structural pathways in the model were statistically significant for African American youth while only one structural pathway produced a significant parameter estimate for the data provided by White youth. Two factors can shed light on findings that did not support evidence of moderation in the multigroup models in spite of seemingly clear variations associated with gender and race. First, although p values have been a widely accepted means of characterizing the nature of associations between variables, at some level they are arbitrarily selected points used to norm the process of data analysis and interpretation. In this study a p value equal to or less than .05 was considered a reasonable proxy for statistical significance. Several structural pathways for boys and White adolescents, respectively, exceeded the mark by narrow margins. The fact that many structural pathways approached significance, and the observation that item responses provided by boys and White youth showed a greater degree of spread or variance, provide two possible explanations for understanding findings that did not support moderation by gender and race at the model level.

Summary of Findings

Multigroup analyses produced evidence of significant direct and indirect associations between adolescents' perceptions of the school's social context and behaviors indicative of student engagement. Findings were characterized by variation in model fit and function across gender and racial groups, respectively. The overall pattern of findings suggests that perceptions of the school environment as emotionally warm, coupled with perceptions of supportive teachers and peers, may have been particularly influential in shaping behaviors indicative of school engagement for the girls and African American youth in this sample.

Key findings highlighted

- the significance of school's social context for the motivation and engagement of historically underserved student populations;
- the importance of evaluating measurement invariance when conducting analyses inclusive of cross-group comparisons;
- and, the previously unexplored association between social and academic self-concept of ability beliefs.

These and other findings have the potential to inform future research and practice. These implications will be discussed next.

Implications for Future Research

This section outlines key implications of this dissertation for future research. First, the results of this study illuminate the possibility of gendered and racial variations in the pathways and processes that influence student engagement. When considered alongside societal trends, these findings support the need for ongoing research into the ways in which gender and race may shape the relations among students' perceptions of the school's social

context and behaviors indicative of student engagement. Second, this study's findings inform important methodological issues such as the need to evaluate measurement invariance before estimating structural parameters in data characterized by cultural or demographic diversity and the need to employ more effective indicators of behavioral engagement. Next, this study demonstrates the utility and limitations of a self-systems motivational framework for investigating relations between adolescents' perceptions of the school's social context and behaviors indicative of student engagement. Finally, implications of findings related to social and academic self-concept are discussed.

Societal trends. In the United States and around the world, people are living in times marked by substantial social change. Many changes are ongoing and pervasive in that they exert influence across a broad range of communities and social institutions including schools. Trends like the evolution of gender roles and racial diversity in the public school system represent one area marking the significance of this study for ongoing scholarship.

Evolution of gender roles. Gender roles have and continue to evolve. The results of this study did not reflect a substantial association between boys' perceptions of the school's social context and engagement, nor did it support boy's self-concept of ability beliefs as mediators in the association between context and engagement. However, current performance indicators suggest boys are falling behind educationally in terms of engagement and achievement. Although there are promising lines of investigation (see Weaver-Hightower, 2013), there is no current consensus as to how or to what extent the social context of schools creates obstacles to boys' engagement and achievement. Therefore, as gendered expectations and opportunities continue to be shaped and reshaped by societal practices, it will be important to pursue knowledge pertaining to the role played by gender in affecting

student engagement. Interestingly, there is no chapter focused on gender in *The Handbook of Research on Student Engagement* (Christenson, Reschly, & Wylie, (Eds.), 2012), the most comprehensive volume of scholarly literature to date devoted to the study of student engagement.

Racial diversity. Racial and ethnic minorities will soon represent more than half of all learners entering the U. S. public school system. Racialized patterns of achievement characterized by the persistent underachievement of Black and Latino youth (Quintana et al., 2012) support the premise that some schools have found it difficult to address the challenges associated with increasing multiculturalism. This is an unacceptable position as failure to attain sufficient education is associated with significant individual, community, and national consequences (Autor, 2010; Sum et al., 2009). Like previous studies, this study demonstrated that warm, caring, and supportive school contexts may be especially influential to the development of motivational beliefs and student engagement of minority youth. This finding supports the need for further scholarship on the contributions of the school's social environment to minority youth's school engagement. In 2010, 44% of all students enrolled in the public school system in the United States were children belonging to racial/ethnic groups characterized as non-White (NCES, 2010). The time for advancing research on the intersection of racial group membership and student engagement is now.

Methodological issues. In completion of this study two important methodological issues came to light. First, a burgeoning number of educational and/or psychological studies employ statistical techniques to minimize error associated with nested data. Fewer researchers adhere to the practice of evaluating measurement invariance in studies that invoke cross-group comparisons. This oversight is problematic. Without knowing if the

measurement model performs similarly across groups, one cannot effectively compare findings across groups (Milfont & Fischer, 2010). In this sample a large proportion of gender measurement noninvariance was attributable to measured perceptions of peer support. This implies significant variations in the way that girls and boys perceived and/or responded to questions designed to measure perceptions of peer support. The specific nature and underlying factors that characterize possible gender differences related to the measurement of peer support represents interesting possibilities for future research. Findings also confirm that scholars who conduct research on peers as a source of social support for achievement related outcomes should ensure that measurement invariance is evaluated in any research inclusive of gender comparisons. More generally, it is highly recommended that all studies that include hypotheses defined by cross-group comparisons evaluate the measurement model for invariance across groups before proceeding with the estimation of structural parameters.

Second, the school attendance item produced a weak factor loading which undermined the scale reliability of the latent construct engagement. Although administrative records of attendance have been used in many studies as indicators of behavioral engagement, they did not represent an effective measure of behavioral engagement in this study when combined with self-reported indicators of effort and compliance. As contemporary scholarship emphasizes the multifaceted nature of student engagement, additional work is needed to develop reliable scales to measure the cognitive, affective, and behavioral components of engagement. In addition to societal trends and methodological issues, the findings of this study support and demonstrate the challenge of drawing on a self-systems motivational perspective to model student engagement.

Theoretical considerations. The model of student engagement tested here drew theoretical support from the Self-Systems Model of Motivational Development (Connell & Wellborn, 1991). This framework situates the roots of motivation and action in the interplay between contextual influences and individual processes. Educational psychology recognizes that social contexts and self-concept of ability beliefs contribute significantly to behaviors indicative of school engagement (National Research Council & Institute of Medicine, 2004). However, this study's results demonstrated perceptions of the social context and self-concept of ability beliefs contributing to the school engagement of some groups of adolescents but not others. Does this mean that the SSMMD represents an appropriate framework to guide investigations of school motivation and achievement for adolescent girls and African American youth but an ineffective framework for studying these same constructs when focusing on boys and White youth? For reasons previously outlined, I do not believe this to be true. Variations of the self-systems model tested here have shown utility in diverse studies linking context, motivation, and school performance related outcomes (see Chapter 2). It is unlikely that disparities in model fit and function signify a failure of theory. A productive approach to further insight into the relations between a school's social context and student engagement might entail revision of the model to include different dimensions of the social context, different self-processes known to affect motivation and behavior, and different indicators and/or components of school engagement.

Social and academic self-concept of ability beliefs. Finally, two interesting findings emerged in regards to social and academic self-concept of ability. First, many of the structural pathways represented in the hypothesized model have been tested before (Diseth et al., 2012; Patrick et al., 2007; Sakiz et al., 2012; Skinner et al., 2009) although most studies

focused on academic rather than social self-concept of ability beliefs as mediators in the association between perceptions of school context and student engagement. Therefore the findings of this study that characterize social self-concept of ability beliefs as a mechanism linking adolescents' perceptions of the school context with behaviors indicative of student engagement are noteworthy. Findings that suggest social self-concept of ability beliefs influence academic self-concept of ability beliefs are of equal import. Social and academic represent distinct domains in which ability-related beliefs form and operate. However, the development of both social and academic self-concept of ability beliefs is predicated on a common set of self-regulatory processes (Wentzel, 2010). Little attention has been given to this relationship in educational and psychological research. In light of research that suggests adolescents assign special importance to social relations scholars should attempt to advance understanding of the relations between social and academic self-concept of ability beliefs and investigate ways in which this connection might be effectively utilized to support student engagement and/or other educational outcomes that have been historically linked to students' perceptions of academic competence.

Summary of implications for future research. A number of implications for future research have been discussed. These implications fell into four broad categories. First, societal trends such as changing gender roles, racial diversity, and shifting labor demands support the need for additional scholarship to build on the findings of this study that denote the influence of gender and racial group membership on student engagement. Second, future researchers should evaluate measurement invariance whenever research designs include cross-group comparisons and work to identify and utilize more effective measures of engagement. Third, research can invoke a self-systems framework to explore the influence

of alternate dimensions of the school's social context, additional self-processes, and diverse indicators and/or components of student engagement. And finally, the findings of this study suggest the association between social and academic competence beliefs as a fruitful area for future scholarship. Whereas these implications relate to the ongoing production of disciplinary knowledge, education is enhanced when knowledge is translated into practices to promote student learning, achievement, and success. In light of this, the following section will highlight some practical applications of this study's findings for schools and schooling.

Implications for Practice

Economic uncertainty, downsizing and restructuring in the labor market, increasing economic disparities, patterns of immigration and urbanization, and technological advances represent major cultural changes reshaping the contexts of adolescents' lives. In the midst of increasingly complex and uncertain times, schools are struggling to meet the mandate of preparing all students with the knowledge and skills needed to function in adult roles. Keeping adolescents engaged in school can be challenging regardless of individual circumstances: Many adolescents appear to be chronically disengaged with school based on reports of boredom, inattentiveness, lack of effort, and failure to complete required assignments (National Research Council & Institute of Medicine, 2004). The findings of this study highlight the influence of social relationships on adolescents' school engagement. This section summarizes ways in which schools can apply this knowledge to enhance student engagement.

First, school systems should consider reductions in school size and/or the creation of schools or academies within schools. Studies link the number of students served within an individual school with students' perceptions of the school's social context and engagement

(Crosnoe, Kirkpatrick, & Elder, 2004; Lee & Burkham, 2003; National Research Council & Institute of Medicine, 2004). Research on learning communities has shown that smaller theme or career-based communities within larger school settings can enhance students' perceptions of the availability of social support and behaviors indicative of engagement (Darling-Hammond, Ancess, & Ort, 2002; Kemple & Snipes, 2000). Second, instructional practices can promote positive social relations to increase student engagement (Hamm, Farmer, Lambert, & Gravelle, 2014; Ryan & Patrick, 2001; Wang & Holcombe, 2010). Interventions to enhance student engagement tied to social participation have emphasized the use of cooperative or collaborative groupwork and peer assisted learning tasks (Hamm et al., 2010; Greenwood, Horton, & Utley, 2002; Rohrbeck, Ginsburg-Block, Fantuzzo, & Miller, 2003). Third, teacher education efforts should emphasize adolescent development and the significance of social relations. Supporting Early Adolescents' Learning and Social Success (SEALS) represents an exemplary model to enhance academic engagement through professional development. SEALS prepares teachers to apply instructional practices grounded in knowledge of cognitive development, behavioral management, and social dynamics. Research on SEALS indicates program effectiveness in terms of increasing academic and behavioral gains (Hamm et al., 2014, 2010). Fourth, school personnel should do everything within their power including organizing lobbying efforts to secure funding for staff trained to work with issues such as social aggression and truancy. Proactive approaches to relationship building such as the provision of regular counseling or mentorship within the school setting can positively impact students' perceptions of the social climate, improve behavior, and increase student engagement (Epstein & Sheldon, 2002; Sinclair, Christenson, Lehr, & Anderson, 2003; Sinclair, Christenson, & Thurlow, 2005). In concert with proactive

relationship building, the nature and enforcement of a school's behavioral code represents an additional dimension of the social context of schooling that has been linked with student engagement (Ripsky & Gregory, 2009). This is relevant in light of the previous conclusion that research is needed to identify alternate dimensions of the social context of schooling that contribute to student engagement. Student participation in structured activities represents the fifth and final practical implication of this study's findings to be discussed here. Positive social relationships and increases in perceptions of school belonging have been linked with participation in extracurricular programs, afterschool programs, and summer programs (Eccles, Barber, Stone, & Hunt, 2003; Feldman & Matjasko, 2005). As these factors contribute to student engagement, educational practitioners should look closely at ways to expand these types of opportunities for all students, but particularly for students who are at risk of failing or dropping out of school due to limited academic motivation and engagement.

This section has presented implications for educational practices that can define school and classroom contexts to promote adolescents' school engagement. Reducing school size or creating schools within schools, employing pedagogy that emphasizes social interactions, implementing professional development that focuses on adolescent development and the broader significance of social relations, providing school-based counseling and mentorship, and encouraging participation in school-based structured activities all represent valid means of enhancing adolescents' perceptions of social relationships and social climate in schools which ultimately influence student engagement. Whereas this study has notable implications for future research and educational practice several limitations should be considered.

Limitations of the Study

The results of this dissertation research are limited by a number of factors. First, the data that were analyzed were collected as part of MADICS (Eccles, 1997), and several limitations relate to the use of this secondary data set. To begin with, the original data was collected in the early 1990s and is arguably outdated. The data were collected across a single county, and the county's population reflected an African American majority. The size and racial composition of the sample facilitated the investigation of the separate influences of gender and race on student engagement. Although gender and race are distinctive social constructs that contribute to human development, scholars recognize the need to study the intersections of gender and race as they contribute to educational experiences and outcomes (Meece & Askew, 2011; Rowley et al., 2010). However, the limited number of White participants in the sample did not enable accounting for gender by racial or racial by gender interactions.

As previously discussed, many of the adolescent participants attended schools that served primarily African American neighborhoods. Research indicates that schools serving mostly African American youth can represent unique ecological niches with characteristics and processes that differ from schools that are racially representative of the general population (see Rowley et al., 2010). In addition, the county and the schools where data were collected have undergone marked change over the last two decades. Whereas the county's population is still largely African American, the gap in earnings between wealthy and economically disadvantaged residents has increased significantly. Schools that once served thriving black middle class neighborhoods serve larger numbers of economically disadvantaged families. Economic decline has created a number of challenges for the public

school system. These factors suggest that the results of this study are not fittingly generalizable. As trends such as urbanization and immigration continue to accelerate, keen attention should be directed toward the contributions of school and community demographics in shaping adolescents' school engagement.

Additional limitations associated with the use of secondary data relate to the fact that these data were not collected to evaluate the hypothesized model of student engagement. As a result, there were limited indicators available in the data set to construct the latent constructs represented in the model. MADICS, as is the case with much of the research conducted by Eccles and colleagues, invokes a perspective on achievement motivation tied in part to students' expectancies for success in a given task or domain (Eccles et al., 1983). This being the case, there were sufficient items to construct reliable scales for the variables that emphasized self-concept of ability beliefs. Unfortunately, different circumstances applied with the context and engagement scales. While there were three reasonable indicators of school climate, there were limited indicators to measure students' perceptions of teacher and peer support. In response, perceptions of teachers' and peers' instrumental and emotional support were combined with perceptions of school climate to create a single latent construct representing adolescents' perceptions of the school's social context. It is reasonable to assume that the influence of the whole (i.e., the school's social context) is greater than the influence of the sum of its individual parts (i.e., climate, teacher instrumental and emotional support, peer instrumental and emotional support). However, it is also responsible to note that these dimensions of climate and support are distinct and may not have functioned most effectively as a single construct. The marginal scale reliability of the seven- item scale that represents the latent construct social context supports this assumption.

Likewise, the scale reliability for the indicators that represented the outcome variable engagement fell below the range of values recommended to safeguard internal validity. The decision to focus on engagement as a behavioral construct limited the availability of possible indicators to select from. Whereas the individual items that comprised the engagement scale represent key aspects of behavioral engagement in schools (Appleton, Christenson, & Furlong, 2008; Fredricks et al., 2004), as previously noted, the attendance item produced a very low factor loading which diminished overall scale reliability. As this item represented one of only three items available to measure engagement as a behavioral construct, this was unavoidable. Because low scale reliability represents a clear threat to internal validity, the findings of this study should be considered with caution.

Further limitations associated with the findings reported here relate to the data itself. First, this study employed cross-sectional data drawn from a single wave of the Maryland Adolescent Development in Context Study (Eccles, 1997). In light of the cross-sectional nature of the data, it is not appropriate to assume causality in the model. The structural pathways tested in the model of student engagement put forth by the present study are more accurately characterized as descriptions of the influence exerted on one variable by another. In addition, it is pertinent to consider the self-reported nature of the data. Two out of the three indicators of the outcome variable student engagement were self-reported. Adolescent participants may have over and/or underestimated their own engagement in school. This assumption is viable as Likert-type items are prone to various types of response bias. Response bias provides a possible explanation for patterns of skewness and kurtosis in the data which defined another limitation of the work. Because values for skewness and kurtosis exceeded expected values under the normal distribution, data were defined as categorical and

all subsequent analyses employed a weighted least squares approach to model estimation.

Although weighted least squares represented the appropriate means of model estimation with the data set used in this study, maximum likelihood is more widely used as it is known to be more precise in determining parameter estimates.

Concluding Remarks

The purpose of this study was to investigate the intertwining nature of social, self, and academic processes in regards to adolescents' engagement with schooling. More specifically the study examined self-concept of ability beliefs in social and academic domains as processes through which students' perceptions of the school's social context influence behaviors indicative of student engagement. In this sample, self-concept of ability beliefs mediated the association between perceptions of context and school engagement for girls and for African American youth. The study makes a unique contribution to the literature in that it evaluated the relation between social and academic self-concept of ability beliefs. The most interesting finding of this study may very well be that for some groups of students, social self-concept of ability beliefs exerted a statistically significant influence on academic self-concept of ability beliefs. As the model did not hold uniformly across groups defined by gender and groups defined by race, additional research is called for to advance insight into how school engagement is shaped by unique and intersecting social identities.

Scholarship on learners and learning broadly advances theoretical perspectives that include an emphasis on social participation (e.g., Aronson & Steele, 2010; Hamm & Zhang, 2010; Wentzel, 2010). In line with this trend, this study emphasized the influence of social participation on school engagement. The work is increasingly germane as macrostructural changes taking place in the United States impact adolescent development through the

reshaping of culture and pathways available to adulthood (Arnett, 2012). An aging population signifies new limitations on funding for social services like education and healthcare that have bearing on adolescents' lives. Globalization and rapidly evolving labor markets represent new opportunities and uncertainties. Patterns of in migration create conditions potentially giving rise to prejudice, discrimination, and socioeconomic marginalization. Adolescents are impacted by the reduction in the number and type of jobs available in the U.S. and an increase in the levels of specialized training and/or formal education needed to compete for entry level positions. A widening gap in access to and resources for education is likely to magnify social inequalities. Considering these circumstances, schools and educators face rising pressures to define and nurture the knowledge and skills students need to be productive participants in a rapidly changing world. Unfortunately, current literature identifies a disproportionately large percentage of American adolescents as chronically disengaged in school (Aud et al., 2012; Wigfield et al., 2006; Yazzie-Mintz, 2009). Research also demonstrates the detrimental consequences associated with academic disengagement (Laird et al., 2008; Sum et al., 2009).

In light of these circumstances, the present study can guide attempts by scholars and practitioners to disrupt the status quo defined by patterns of dwindling motivation and engagement in schools. This study's findings highlight the utility of utilizing a self-systems framework to understand the ways in which social participation in school contexts can support adolescents' motivation and engagement. Findings show a clear link between social and academic processes that contribute to expressions of student engagement. By attending to the role of the school's social context, scholars and practitioners have the opportunity to contribute to the process of shaping schools and schooling to more effectively meet

individual and community needs. If being successful in the student role is a means of enhancing the life pathways of our nation's youth in opening up access to a broader array of social and economic opportunities, educational scholarship and practice must attend closely to mechanisms and/or processes expressed in school contexts that can assist students in developing and sustaining academic motivation and engagement. Advancing insight into the influences of and relations between social and self-processes in the development of student engagement offers a tangible means of informing educational reform efforts to support adolescents' successful participation in schools, the workforce, and beyond.

APPENDIX A: FREQUENCIES AND PERCENTAGES FOR CATEGORICAL VARIABLES

Calibration Sample (*n* = 695)

Indicator	Response Category							
	1	2	3	4	5	6	7	8
staff cares	113 16.4%	183 26.6%	271 39.4%	121 17.6%				
staff does not encourage	103 14.9%	139 20.2%	257 37.3%	190 27.6%				
kids belong	91 13.2%	261 37.9%	190 27.6%					
teacher support emotional	86 12.4%	141 20.4%	200 28.9%	175 25.3%	89 12.9%			
teacher support instrumental	119 17.2%	175 25.3%	207 29.9%	192 27.7%				
peer support emotional	136 19.7%	198 28.6%	217 31.4%	141 20.4%				
peer support instrumental	95 13.8%	163 23.5%	186 27.0%	169 24.6%	75 10.9%			

Indicator	Response Category							
	1	2	3	4	5	6	7	8
good at math 1	67 9.8%	125 18.2%	162 23.6%	167 24.3%	165 24.1%			
good at other subjects	43 6.3%	128 18.9%	186 27.4%	198 29.2%	124 18.3%			
good at math 2	83 12.1%	100 14.6%	125 18.2%	141 20.6%	237 34.5%			
good at making friends 1	78 11.5%	88 12.9%	140 20.6%	199 29.3%	175 25.7%			
good at making friends 2	50 7.3%	73 10.6%	118 17.2%	167 24.3%	278 40.5%			
how popular are you	81 11.9%	84 12.3%	131 19.2%	166 24.3%	139 20.4%	82 12.0%		
skip school/cut classes	516 75.1%	119 17.1%	36 5.2%	16 2.3%				
finish homework	189 27.3%	426 61.5%	40 5.8%	38 5.5%	189 27.3%			
7 th grade absences	109 16.6%	143 21.8%	118 18.0%	88 13.4%	62 9.5%	43 6.6%	30 4.6%	63 9.6%

Validation Sample ($n = 665$)

Indicator	Response Category							
	1	2	3	4	5	6	7	8
staff cares	96 14.6%	171 26.1%	281 42.8%	108 16.5%				
staff does not encourage	103 15.7%	136 20.7%	258 39.3%	160 24.4%				
kids belong	77 11.7%	242 36.8%	338 51.4%					
teacher support emotional	92 13.9%	132 20.0%	213 32.2%	150 22.7%	74 11.2%			
teacher support instrumental	103 15.5%	156 23.5%	227 34.2%	177 26.6%				
peer support emotional	155 23.5%	177 26.8%	180 27.3%	148 22.4%				
peer support instrumental	101 15.4%	175 26.7%	169 25.8%	135 20.6%	76 11.6%			
good at math 1	79 12.1%	118 18.0%	158 24.2%	143 21.9%	156 23.9%			

Indicator	Response Category							
	1	2	3	4	5	6	7	8
good at other subjects	37 5.7%	130 20.0%	188 28.9%	184 28.3%	112 17.2%			
good at math 2	94 14.3%	115 17.5%	116 17.7%	133 20.3%	198 30.2%			
good at making friends 1	68 10.4%	91 13.9%	147 22.5%	182 27.8%	166 25.4%			
good at making friends 2	55 8.4%	72 11.0%	111 16.9%	175 26.7%	243 37.0%			
how popular are you	76 11.6%	82 12.5%	154 23.5%	153 23.4%	101 15.4%	88 13.5%		
skip school or cut classes	463 70.2%	143 21.7%	36 5.5%	18 2.7%				
usually finish homework	167 25.2%	422 63.6%	44 6.6%	31 4.7%				
7 th grade absences	95 15.2%	128 20.4%	109 17.4%	78 12.5%	71 11.3%	47 7.5%	32 5.1%	66 10.5%

Note. Small cell counts most likely played a role in the inability to replicate findings when samples were split by gender and race (Roger Millsap, personal communication, March 9, 2013). For this reason, frequency counts and percentages are reported separately for the calibration and validation samples.

APPENDIX B: FREQUENCIES, PERCENTAGES, AND INVARIANCE MODELS FOR CATEGORICAL VARIABLES
SAMPLE V2

Sample V2 (*n* = 665)

Indicator	Response Category							
	1	2	3	4	5	6	7	8
staff cares	96 14.4%	171 25.7%	281 42.3%	108 16.2%				
staff does not encourage	103 15.5%	136 20.5%	258 38.8%	160 24.1%				
kids belong	77 11.6%	242 36.4%	338 50.8%					
teacher support emotional	92 13.8%	132 19.8%	213 32.0%	150 22.6%	74 11.1%			
teacher support instrumental	103 15.5%	156 23.5%	227 34.1%	177 26.6%				
peer support emotional	155 23.3%	177 26.6%	180 27.1%	148 22.3%				
peer support instrumental	101 15.2%	175 26.3%	169 25.4%	135 20.3%	76 11.4%			

Indicator	Response Category							
	1	2	3	4	5	6	7	8
good at math 1	79	118	158	143	156			
	11.9%	17.7%	23.8	21.5%	23.5%			
good at other subjects	37	130	188	184	112			
	5.6%	19.5%	28.3%	27.7%	16.8%			
good at math 2	94	115	116	133	198			
	14.1%	17.3%	17.4%	20.0%	29.8%			
good at making friends 1	68	91	147	182	166			
	10.2%	13.7%	22.1%	27.4%	25.0%			
good at making friends 2	55	72	111	175	243			
	8.3%	10.8%	16.7%	26.3%	36.5%			
how popular are you	76	82	154	153	101	88		
	11.4%	12.3%	23.2%	23.0%	15.2%	13.2%		
skip school/cut classes	463	143	36	18				
	69.6%	21.5%	5.4%	2.7%				
finish homework	167	422	44	31				
	25.1%	63.5%	6.6%	4.7%				
7 th grade absences	95	128	109	78	71	47	32	66
	14.3%	19.2%	16.4%	11.7%	10.7%	7.1%	4.8%	9.9%

Invariance Models for Sample V2

Gender Models	χ^2	df	Goodness-of-fit Statistics				Model Comparison	
			CFI	TLI	RMSEA	WRMR	$\Delta\chi^2$	p value
Configural	377.85	198	.97	.96	.05	1.40		
Metric	379.55	204	.97	.97	.05	1.41	4.168	.65
Scalar	508.82	244	.96	.96	.06	1.65	147.56	***
Scalar G2	482.37	242	.96	.96	.05	1.60	116.00	***
Scalar G3	456.74	240	.96	.96	.05	1.54	85.88	***
Scalar G4	428.22	238	.97	.97	.05	1.49	49.65	*
Scalar G5	421.06	237	.97	.97	.05	1.47	40.32	.19

Race Models	χ^2	df	Goodness-of-fit Statistics				Model Comparison	
			CFI	TLI	RMSEA	WRMR	$\Delta\chi^2$	p value
Configural	418.66	198	.96	.95	.06	1.49		
Metric	419.90	204	.96	.96	.06	1.49	3.70	.72
Scalar	541.42	244	.95	.95	.06	1.71	143.61	***
Scalar R2	503.86	242	.95	.96	.06	1.64	98.35	***
Scalar R3	484.13	240	.96	.96	.06	1.60	69.32	***

*** $p < .001$, ** $p < .01$, * $p < .05$

REFERENCES

- Ahmed, W., Minnaert, A., van der Werf, G., & Kuyper, H. (2010). Perceived social support and early adolescents' achievement: The mediational roles of motivational beliefs and emotions. *Journal of Youth And Adolescence*, 39, 36-46.
- Alexander, K. L., Entwisle, D. R., & Kabbani, N. S. (2001). The dropout process in life course perspective: Early risk factors at home and school. *Teachers College Record*, 103(5), 760-822.
- American Psychological Association. (2003). Guidelines on multicultural education, training, research, practice, and organizational change for psychologists. *American Psychologist*, 58, 377 – 402.
- Anderman, E. M. (2002). School effects on psychological outcomes during adolescence. *Journal of Educational Psychology*, 94(4), 795-809.
- Anderman, L., & Anderman, E. (1999). Social predictors of changes in students' achievement goal orientations. *Contemporary Educational Psychology*, 24, 21-37.
- Anderman, L., Andrzejewski, C. E., & Allen, J. (2011). How do teachers support students' motivation and learning in their classrooms?. *Teachers College Record*, 113, 969-1003.
- Appleton, J., Christenson, S., & Furlong, M. (2008). Student engagement with school: Critical conceptual and methodological issues of the construct. *Psychology in the Schools*, 45, 369 – 386.
- Archambault, I., Janosz, M., Morizot, J., & Pagani, L. (2009). Adolescent behavioral, affective, and cognitive engagement in school: Relationship to dropout. *Journal of School Health*, 79(9), 408-415.
- Arnett, J. J. (2012). *Adolescence and emerging adulthood: A cultural approach*. Upper Saddle River, N.J.: Pearson Prentice Hall.
- Arnett, J. (2000). Emerging adulthood: A theory of development from the late teens to through the twenties. *American Psychologist*, 469 – 480.
- Aronson, J., & Steele, C. (2010). Stereotypes and the fragility of academic competence, motivation, and self-concept. In A. Elliot & C. Dweck (Eds.) *Handbook of competence and motivation* (pp. 436 – 456). New York: Guilford Press.
- Aud, S., Hussar, W., Johnson, F., Kena, G., Roth, E., Manning, E., Wang, X., & Zhang, J. (2012). *The Condition of Education 2012*. National Center for Education Statistics. Washington, DC. Retrieved January 3, 2013 from <http://nces.ed.gov/pubsearch>.
- Autor, D. (2010). The polarization of job opportunities in the U.S. Labor Market: Implications for employment and earnings. Washington, DC: The Brookings Institution & Center for American Progress. Retrieved January 7, 2013 from <http://economics.mit.edu/files/5554>.

- Azmitia, M., & Cooper, C. (2001). Good or bad? Peer influences on Latino and European American adolescents' pathways through school. *Journal of Education For Students Placed At Risk*, 6, 45-71.
- Bailey, C., & Boykin, A. W., (2001). The role of task variability and home contextual factors in the academic performance and task motivation of African American elementary school children. *Journal of Negro Education*, 70, 84 – 95.
- Balfanz, R., Herzog, L., & Mac Iver, D. (2007). Preventing student disengagement and keeping students on the graduation path in urban middle-grades schools: Early identification and effective interventions. *Educational Psychologist*, 42, 223–235.
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.
- Baron, R., & Kenny, D. (1986). The moderator – mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51, 1173 – 1182.
- Basto, M., & Pereira, J. (2012). An SPSS R-menu for ordinal factor analysis. *Journal of Statistical Software*, 46, 1 – 29.
- Battistich, V., Solomon, D., & Watson, M. S. (1997). Caring school communities. *Educational Psychologist*, 32, 137-151.
- Baumeister, R. & Leary, M. (1995). The need to belong: Desire for interpersonal attachments as fundamental human motivation. *Psychological Bulletin*, 117, 497-529.
- Belenky, M., Clinchy, B., Goldberger, N., & Tarule, J. M. (1986). *Women's ways of knowing*. New York: Basic Books.
- Benner, A. D., Graham, S., & Mistry, R. S. (2008). Discerning direct and mediated effects of Ecological Structures and Processes on Adolescents' Educational Outcomes. *Developmental Psychology*, 44, 840-854.
- Berndt, T., & Keefe, K. (1995). Friends' influence on adolescents' adjustment to school. *Child Development*, 66, 1312-1329.
- Bingham, G., & Okagaki, L. (2012). Ethnicity and student engagement. In S. L. Christenson, A. L. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 65-95). New York: Springer.
- Bleach, K. (1998). Why the likely lads lag behind: An examination of reasons for some boys' poor academic performance and behavior in school. In K. Bleach (Ed.), *Raising boys' achievement in schools* (pp. 1-20). Staffordshire, UK: Trentham Books.
- Boykin, A. (1983). The academic performance of Afro-American children. In J. Spence

- (Ed.), *Achievement and achievement motives* (pp. 321 – 371). San Francisco: W. Freeman.
- Boykin, A., & Allen, B. (1988). Rhythmic-movement facilitation of learning in working class Afro-American children. *Journal of Genetic Psychology*, 149, 335 – 348.
- Boykin, A. W., & Cunningham, R. (2001). The effects of movement expressiveness in story content and learning context on the analogical reasoning performance of African American children. *Journal of Negro Education*, 70, 72 – 83.
- Boykin, A. W., Lilja, A., & Tyler, K. (2004). The influence of communal versus individual learning context on the academic performance of African-American elementary school students. *Learning Environments Journal*, 7, 227 -244.
- Bouchey, H., & Harter, S. (2005). Reflected appraisals, academic self-perceptions, and math/science performance during early adolescence. *Journal of Educational Psychology*, 97, 673-686.
- Brand, S., Felner, R., Shim, M., Seitsinger, A., & Dumas, T. (2003). Middle school improvement and reform: Development and validation of a school-level assessment of climate, cultural pluralism, and school safety. *Journal of Educational Psychology*, 95, 570 – 588.
- Bridgeland, J., DiIulio Jr., J., & Morison, K. (2006). *The silent epidemic: Perspectives on high school dropouts*. Washington, DC: Civil Enterprises.
- Bronfenbrenner U. (1979). *The ecology of human development: Experiments by nature and design*. Cambridge, MA: Harvard University Press.
- Brown, B. & Larson, J. (2009). Peer relationships in adolescence. In Lerner, R. & Steinberg, L. (Eds.) *Handbook of adolescent psychology*, Volume 2 (pp. 74-103), Hoboken, NJ: John Wiley & Sons.
- Brown, T. (2006). *Confirmatory factor analysis for applied research*. New York: Guilford Press.
- National Center on Effective Secondary Schools. (1988). *The high school as community: Contextual influences and consequences for students and teachers*. Washington, DC: Bryk, A. S., Driscoll, M.
- Byrne, B. (2012). *Structural equation modeling with Mplus*. New York, NY: Routledge.
- Byrne, B., Shavelson, R., & Múthen, B. (1989). Testing for the equivalence of factor covariance and mean structures: The issue of partial measurement invariance. *Psychological Bulletin*, 105, 456 – 466.
- Carnegie Council on Adolescent Development (1989). *Turning points: Preparing American youth for the 21st century*. Washington, D.C.: Carnegie Council on Adolescent Development.

- Cho, Y., Weinstein, C., & Wicker, F. (2011). Perceived competence and autonomy as moderators of the effects of achievement goal orientations. *Educational Psychology*, 31, 393-411.
- Chouinard, R., Karsenti, T. & Roy, N. (2007), Relations among competence beliefs, utility value, achievement goals, and effort in mathematics. *British Journal of Educational Psychology*, 77. 501–17.
- Christenson, S., Reschly, A., & Wylie, C. (Eds.). (2012). *Handbook of research on student engagement*. New York: Springer.
- Comer, J. (2010). The Yale Child Study Center School Development Program. In J. Meece & J. Eccles (Eds.), *Handbook on schools, schooling, and human development* (pp. 419-433). New York: Routledge.
- Connell, J. P. (1990). Context, self, and action: A motivational analysis of self-system processes across the life-span. In D. Cicchetti & M. Beeghly (Eds.), *The self in transition: From infancy to childhood*. Chicago: University of Chicago Press.
- Connell, J., Spencer, M., & Aber, J. (1994). Educational risk and resilience in African-American youth: Context, self, action, and outcomes in school. *Child Development*, 65, 493-506.
- Connell, J., Halpern-Felsher, B. L., Clifford, E., & Crichlow, W. (1995). Hanging in there: Behavioral, psychological, and contextual factors affecting whether African-American adolescents stay in high school. *Journal of Adolescent Research*, 10, 41-63.
- Connell, J., & Wellborn, J. (1991). Competence, autonomy, and relatedness: A motivational analysis of self-esteem processes. In M. R. Gunnar & L. A. Sroufe (Eds.), *Self processes and development* (Vol. 23). Hillsdale, N.J.: Lawrence Erlbaum Assoc.
- Connell, R. (1996). Teaching the boys: new research on masculinity, and gender strategies for schools, *Teachers College Record*, 98, pp. 206–235.
- Constantine, M., & Sue, D. (2006). Factors contributing to optimal human functioning in people of color in the United States. *The Counseling Psychologist*, 34, 228 – 244.
- Corbett, C., Hill, C., & Rose, A. (2008). Where the girls are: The facts about gender equity in education. Washington, DC: American Association of University Women.
- Creed, P., Muller, J., & Patton, W. (2003). Leaving high school: The influence and consequences for psychological well-being and career-related confidence. *Journal of Adolescence*, 26, 295 – 311.
- Crosnoe, R., Johnson, M., & Elder, G. (2004). Intergenerational bonding in school: The behavioral and contextual correlates of student-teacher relationships. *Sociology of Education*, 77, 60 – 81.
- Crosnoe, R., Kirkpatrick, M., & Elder, G., (2004). School Size and the interpersonal side of education: An examination of race/ethnicity and organizational context. *Social*

- Science Quarterly*, 85, 1259 – 1274.
- Cross C. P., Copping L. T., Campbell A. (2011). Sex differences in impulsivity: a meta-analysis. *Psychological Bulletin*, 137, 97–130.
- Danielsen, A. G., Samdal, O., Hetland, J., & Wold, B. (2009). School-related social support and students' perceived life satisfaction. *Journal of Educational Research*, 102, 303-318.
- Danielsen, A. G., Breivik, K., & Wold, B. (2011). Do perceived academic competence and school satisfaction mediate the relationships between perceived support provided by teachers and classmates, and academic initiative?. *Scandinavian Journal of Educational Research*, 55, 379-401.
- Darling-Hammond, L., Aneess, J., & Ort, S. (2002). Reinventing high school: Outcomes of the Coalition Campus Schools Project. *American Educational Research Journal*, 39, 639–673.
- Deci, E. L. (1998). The relation of interest to motivation and human needs: The self-determination theory viewpoint. In L. Hoffmann, A. Krapp, K. A. Renninger, & J. Baumert (Eds.), *Interest and learning* (pp. 146-162). Kiel, Germany: Institute for Science Education.
- Deci, E., & Ryan, R. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum.
- Deci, E. L., Vallerand, R. J., Pelletier, L. G., & Ryan, R. M. (1991). Motivation and education: The self-determination perspective. *The Educational Psychologist*, 26, 325-346.
- Demaneet, J., & Van Houtte, M. (2012). School belonging and school misconduct: The differing role of teacher and peer attachment. *Journal of Youth And Adolescence*, 41, 499-514.
- Dill, E., & Boykin, A. (2000). The comparative influence of individual, peer tutoring, and communal learning contexts on the recall of African American children. *Journal of Black Psychology*, 26, 65 – 78.
- Dimitrov, D. (2010). Testing for factorial invariance in the context of construct validation. *Measurement and Evaluation in Counseling and Development*, 43, 121 – 149.
- Diseth, A., Danielsen, A. G., & Samdal, O. (2012). A path analysis of basic need support, self-efficacy, achievement goals, life satisfaction and academic achievement level among secondary school students. *Educational Psychology*, 32, 335-354.
- Dotterer, A. M., McHale, S. M., & Crouter, A. C. (2009). Sociocultural factors and school engagement among African American youth: The roles of racial discrimination, racial socialization, and ethnic identity. *Applied Developmental Science*, 13, 61-73.
- Duchesne, S., & Larose, S. (2007). Adolescent parental attachment and academic motivation

- and performance in early adolescence. *Journal of Applied Social Psychology*, 37, 1501-1521.
- Durik, A., Vida, M., & Eccles, J. (2006). Task values and ability beliefs as predictors of high school literacy choices: A developmental analysis. *Journal of Educational Psychology*, 98, 382-393.
- Eccles, J. (1994). Understanding women's educational and occupational choices: Applying the Eccles et al. model of achievement-related choices. *Psychology of Women Quarterly*, 18, 585 – 610.
- Eccles, J. (1997), "MADICS Study of Adolescent Development in Multiple Contexts, 1991-1998", <http://hdl.handle.net/1902.1/01066> UNF:3:pRf0kEYV4gNpDP4Wtds8Fw== Murray Research Archive [Distributor] V1 [Version]
- Eccles, J. S., Adler, T. F., & Meece, J. L. (1984). Sex differences in achievement: A test of alternate theories. *Journal of Personality and Social Psychology*, 46, 26-43.
- Eccles, J., Adler, T. F., Futterman, R., Goff, S. B., Kaczala, C. M., Meece, J., & Midgley, C. (1983). Expectancies, values and academic behaviors. In Spence, J. T. (ed.), *Achievement and achievement motives*. San Francisco: W. H. Freeman.
- Eccles, J. S., Barber, B. L., Stone, M., & Hunt, J. (2003). Extracurricular activities and adolescent development. *Journal of Social Issues*, 59, 865–889.
- Eccles, J., & Midgley, C. (1989). Stage/environment fit: Developmentally appropriate classrooms for early adolescents. In R. Ames & C. Ames (Eds.), *Research on motivation in education*, Vol. 3 (pp. 139 – 181). New York: Academic Press.
- Eccles, J., Midgley, C., Adler, T. (1984). Grade-related changes in the school environment: Effects on achievement motivation. In J. Nicholls (Ed.), *The development of achievement motivation*, Vol. 3 (pp. 282-331). Greenwich, CT: JAI Press.
- Eccles, J., Wigfield, A., & Sciefele, U. (1998). Motivation to succeed. In W. Damon (Series Ed.) & N. Eisenberg (Vol. Ed.) *Handbook of child psychology: Vol. 3. Social, emotional, and personality development* (pp. 1017 – 1095). New York: John Wiley.
- Eccles, J.S. & Roeser, R.W. (2011). Schools a developmental context during adolescence. *Journal of Research on Adolescence*, 21, 225-241.
- Eccles, J. S., & Roeser, R. W. (2009). Schools, academic motivation, and stage-environment fit. In R. M. Lerner, L. Steinberg, R. M. Lerner, L. Steinberg (Eds.) , *Handbook of adolescent psychology, Vol 1: Individual bases of adolescent development* (pp. 404-434). Hoboken, NJ: John Wiley & Sons Inc.
- Eccles, J., & Wang, M. (2012). So what is student engagement anyway? In S. Christensen, A. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 133-145). New York: Springer.

- Editorial Projects in Education (2010). *Graduation by the numbers*. Retrieved January 3, 2013 from <http://www.edweek.org/ew/articles/2010/06/10/34execsum.h29.html>.
- Elliott, A., & Dweck, C. (2005). Competence and motivation. In A. Elliott & C. Dweck (Eds.), *Handbook of competence and motivation*. New York: Guilford Press.
- Ellison, C., Boykin, A., Tyler, K., & Dillihunt, M. (2005). Examining classroom learning preferences among elementary school students. *Social Behavior and Personality*, 33, 699 – 708.
- Elmore, K. C., & Oyserman, D. (2012). If "we" can succeed, "I" can too: Identity-based motivation and gender in the classroom. *Contemporary Educational Psychology*, 37, 176-185.
- Else-Quest, N., Hyde J., Goldsmith H., & Van Hulle, C. (2006). *Psychological Bulletin*, 132, 33 – 72.
- Epstein, J. L., & Sheldon, S. B. (2002). Present and accounted for: Improving student attendance through family and community involvement. *Journal of Educational Research*, 95, 308-318.
- Erikson, E. (1968). *Identity, youth, and crisis*. New York: Norton.
- Eschenbeck H., Kohlmann C., & Lohaus A. (2007). Gender differences in coping strategies in children and adolescents. *Journal of Individual Differences*, 28, 18–26.
- Fan, W., Williams, C. M., & Corkin, D. (2011). A multilevel analysis of student perceptions of school climate: the effect of social and academic risk factors. *Psychology in the Schools*, 48, 632-647.
- Fanning, D. (Executive Producer), (2008, January 22). *Frontline* [Television broadcast]. Boston, MA: Public Broadcasting Service.
- Farmer, T. W., Irvin, M. J., & Thompson, J. H. (2006). School adjustment and the academic success of rural African American early adolescents in the deep south. *Journal of Research In Rural Education*, 21, 1-14.
- Feldlaufer, H., Midgley, C., & Eccles, J. (1988). Student, teacher, and observer perceptions of the classroom environment before and after the transition to junior high school. *Journal of Early Adolescence*, 8, 133-56.
- Feldman, A. F., & Matjasko, J. L. (2005). The role of school-based extracurricular activities in adolescent development: A comprehensive review and future directions. *Review of Educational Research*, 75(2), 159–210.
- Fine, M., Torre, M., Boudin, F., Bowen, I., Clark, J., Hylton, D., Martinez, M., Roberts, R., Smart, P., & Upegui, D. (2001). *Changing minds: The impact of college in a maximum security prison*. New York: City University of New York, Graduate Center.

- Finn, J. D., & Owings, J. (2006). *The adult lives of at-risk students: The roles of attainment and engagement in high school*. Washington, DC: National Center for Education Statistics.
- Finn, J. & Zimmer, K. (2012). Student engagement: What it is? Why does it matter? In S. Christensen, A. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 97-131). New York: Springer.
- Fordham, S., & Ogbu, J. (1986). Black students' school success: Coping with the "burden of acting White". *Urban Review*, 18, 176 – 206.
- Frank, B., Kehler, M., Lovell, T., & Davison, K. (2003). A tangle of trouble: Boys, masculinity, and schooling – future directions. *Educational Review*, 55, 119 – 133.
- Frazier, P., Tix, A., Barron, K. (2004). Testing moderator and mediator effects in counseling psychology research. *Journal of Counseling Psychology*, 51, 115 – 134.
- Fredricks, J., Blumenfeld, P., & Paris, A. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research*, 74, 59–109.
- Fredricks, J. A., & Eccles, J. S. (2002). Children's competence and value beliefs from childhood to adolescence: Growth trajectories in two "male-typed" domains. *Journal of Developmental Psychology*, 38, 519–533.
- Furrer, C. & Skinner, E. (2003). Sense of relatedness as a factor in children's academic engagement and performance. *Journal of Educational Psychology*, 95, 148-162.
- Gadermann, A., Guhn, M., & Zumbo, B. (2012). Estimating ordinal reliability for Likert-type and ordinal item response data: A conceptual, empirical, and practical guide. *Practical Assessment, Research & Evaluation*, 17, 1 – 13.
- George, D., & Mallery, P. (2003). *SPSS for Windows step by step: A simple guide and reference*. 11.0 update (4th ed.). Boston: Allyn & Bacon.
- Gifford-Smith, M. & Brownell, C. (2003). Childhood peer relationships: social acceptance, friendships, and peer networks. *Journal of School Psychology*, 235-284.
- Gilligan, C. (1982). *In a different voice*. Cambridge, MA: Harvard University Press.
- Goodenow, C. (1993). Classroom belonging among early adolescent students: Relationships to motivation and achievement. *Journal of Early Adolescence*, 13, 21-43.
- Goodenow, C., & Grady, K. E. (1993). The relationship of school belonging and friends' values to academic motivation among urban adolescent students. *Journal of Experimental Education*, 62(1), 60-71.
- Graham, S. & Hudley, C. (2007). Race and ethnicity in the study of motivation and competence. In A. Elliot & C. Dweck (Eds.), *Handbook of competence and motivation* (pp. 392-413). New York: Guilford Press.
- Green, G., Rhodes, J., Hirsch, A., Suárez-Orozco, C., & Camic, P. M. (2008). Supportive

- adult relationships and the academic engagement of Latin American immigrant youth. *Journal of School Psychology*, 46, 393-412.
- Green, M., & Way, N. (2005). Self-esteem trajectories among ethnic minority adolescents: A growth curve analysis of the patterns and predictors of change. *Journal of Research on Adolescence*, 15, 151 – 178.
- Greenwood, C.R., Horton, B.T., Utley, C.A. (2002). Academic engagement: Current perspectives on research and practice. *School Psychology Review*, 31(3), 328-349.
- Gregory, A., Cornell, D., & Fan, X. (2011). The relationship of school structure and support to suspension rates for Black and White high school students. *American Educational Research Journal*, 48, 904-934.
- Gregory, A., Skiba, R. J., & Noguera, P. A. (2010). The achievement gap and the discipline gap: Two sides of the same coin? *Educational Researcher*, 39, 59-68.
- Grolnick, W. S., & Ryan, R. M. (1989). Parent styles associated with children's self-regulation and competence in school. *Journal of Educational Psychology*, 8, 143-154.
- Gurian, M. (2001). *Boys and girls learn differently: A guide for teachers and parents*. New York: Jossey Bass.
- Gutierrez, K., & Rogoff, B. (2003). Cultural ways of learning: Individual traits or repertoires of practices. *Educational Researcher*, 32, 19 – 25.
- Hamm, J. V., & Faircloth, B. S. (2005). The role of friendship in adolescents' sense of school belonging. *New Directions for Child and Adolescent Development*, 107, 61-78.
- Hamm, J. V., & Faircloth, B. S. (2005b). Peer context of mathematics classroom belonging in early adolescence. *The Journal of Early Adolescence*, 25, 345-366.
- Hamm, J., Farmer, T., Lambert, K., & Gravelle, M. (2014). Enhancing peer cultures of academic effort and achievement in early adolescence: Promotive effects of the SEALS intervention. *Developmental Psychology*, 50, 216-228.
- Hamm, J. V., Farmer, T. W., Robertson, D., Dadisman, K. A., Murray, A., Meece, J. L., & Song, S. Y. (2010). Effects of a developmentally based intervention with teachers on Native American and White early adolescents' schooling adjustment in rural settings. *Journal of Experimental Education*, 78, 343-377.
- Hamm, J. V., Lambert, K., Agger, C. A., & Farmer, T. W. (2013). Promotive peer contexts of academic and social adjustment among rural African American early adolescent boys. *American Journal of Orthopsychiatry*, 83(2-3), 278.
- Hamm, J. V., Schmid, L., Farmer, T. W., & Locke, B. (2011). Injunctive and descriptive peer group norms and the academic adjustment of rural early adolescents. *The Journal of Early Adolescence*, 31(1), 41-73.

- Hamm, J., & Zhang, L. (2010). School contexts and the development of adolescents' peer relations. In J. Meece & J. Eccles (Eds.) *Handbook of research on schools and schooling, and human development*. New York: Routledge.
- Hirsch, L. (Director/Producer/Writer), & Lowen, C. (Producer/Writer). (2012). *Bully* [Motion picture]. New York, NY: The Weinstein Company
- Holzman, M. (2010). *Yes we can: The Schott 50 state report on public education and Black males 2010*. Cambridge, MA: Schott Foundation for Public Education. Retrieved July 12, 2011 from <http://blackboysreport.org/bbreport.pdf>.
- Hudley, C., & Graham, S. (2001). Stereotypes of achievement striving among early adolescents. *Social Psychology of Education: An International Journal*, 5, 201 – 224.
- Hurley, E., Boykin, a., & Allen, B. (2005). Communal versus individual learning of a math-estimation task: African American children and the culture of learning contexts. *The Journal of Psychology*, 6, 513 – 527.
- Hyde, J., & Durik, A. (2007). In A. Elliott & C. Dweck (Eds.), *Handbook of competence and motivation*. New York: Guilford Press.
- Irvin, M. J., Meece, J. L., Byun, S., Farmer, T. W., & Hutchins, B. C. (2011). Relationship of school context to rural youth's educational achievement and aspirations. *Journal of Youth And Adolescence*, 40, 1225-1242.
- Jacobs, J., Lanza, S., Osgood, D., Eccles, J., & Wigfield, A. (2002). Changes in children's self-competence and values: Gender and domain differences across grades one through twelve. *Child Development*, 73, 509 – 527.
- Janosz, M. (2012). Outcomes of engagement and engagement as an outcome: Some consensus, divergences, and unanswered questions. In S. L. Christenson, A. L. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 695-703). New York: Springer.
- Janosz, M., Archambault, I., Morizot, J., & Pagani, L. (2008). School engagement trajectories and their differential predictive relations to dropout. *Journal of Social Issues*, 64, 21–40.
- Juvonen, J. (2006). Sense of belonging, social bonds, and school functioning. In P. Alexander & P. Winne (Eds.), *Handbook of educational psychology* (pp. 655-674). Mahwah, NJ: Lawrence Erlbaum Associates.
- Juvonen, J. (2007). Reforming middle schools: Focus on continuity, social connectedness, and engagement. *Educational Psychologist*, 42, 197-208.
- Kemple, J. J., & Snipes, J. C. (2000). Career academics: Impacts on students' engagement and performance in high school. New York: Manpower Demonstration Research Corporation.
- Kenny, D. (2011). Measuring model fit. Retrieved March 2, 2013 from

<http://davidakenny.net/cm/fit.htm>.

- Kim, E., & Yoon, M. (2011). Testing measurement invariance: A comparison of multiple-group categorical CFA and IRT. *Structural Equation Modeling: A Multidisciplinary Journal*, 18, 212 – 228.
- Kindermann, T. A., & Skinner, E. A. (2009). How do naturally existing peer groups shape children's academic development during sixth grade?. *European Journal of Developmental Science*, 3, 27-38.
- Klem, A. M., & Connell, J. P. (2004). Relationships matter: Linking teacher support to student engagement and achievement. *Journal of School Health*, 74, 262-273.
- Kline, R. (2011). *Principles and practice of structural equation modeling*. New York: Guilford Press.
- Koth, C. W., Bradshaw, C. P., & Leaf, P. J. (2008). A multilevel study of predictors of student perceptions of school climate: The effect of classroom-level factors. *Journal of Educational Psychology*, 100, 96-104.
- Kuperminc, G. P., Blatt, S. J., Shahar, G., Henrich, C., & Leadbeater, B. J. (2004). Cultural equivalence and cultural variance in longitudinal associations of young adolescent self-definition and interpersonal relatedness to psychological and school adjustment. *Journal of Youth and Adolescence*, 33, 13.
- Laird, J., Cataldi, E. F., Kewal Ramani, A., & Chapman, C. (2008). *Dropout and completion rates in the United States: 2006*. Washington, D.C.: National Center for Education Sciences, U.S. Department of Education.
- Ladson-Billings, G. (2001). The power of pedagogy: Does teaching matter? In W. Watkins, J. Lewis, & V. Chou (Eds.), *Race and education: The roles of history and society in educating African American students* (pp. 73 – 88). Boston: Allyn & Bacon.
- Lam, S., Jimerson, S., Kikas, E., Cefai, C., Veiga, F. H., Nelson, B., & ... Zollneritsch, J. (2012). Do girls and boys perceive themselves as equally engaged in school? The results of an international study from 12 countries. *Journal of School Psychology*, 50, 77-94.
- Langhout, R., & Mitchell, C. (2008). Engaging contexts: Drawing the link between student and teacher experiences of the hidden curriculum. *Journal of Community and Applied Social Psychology*, 18, 593 – 614.
- Lapinski, M., & Rimal, R. (2005). An explication of social norms. *Communication Theory*, 15, 127 – 147.
- Lee, J. (2006). *Tracking achievement gaps in assessing the impact of NCLB on the gaps: An in-depth look into national and state reading and math outcome trends*. Cambridge, MA: The Civil Rights Project at Harvard University.
- Lee, V. E., & Burkam, D. T. (2003). Dropping out of high school: The role of school

- organization and structure. *American Educational Research Journal*, 40, 353-393.
- Lee, V., & Smith, J. (2001). *Restructuring high schools for equity and excellence: What works?* New York, NY: Teachers College Press.
- Levine, D., Bowen, D., Kaplan, R., Kripke, D., Naughton, M., & Shumaker, S. (2003). Factor structure and measurement invariance of the women's health initiative insomnia rating scale. *Psychological Assessment*, 15, 123 – 136.
- Li, Y., & Lerner, R. M. (2011). Trajectories of school engagement during adolescence: Implications for grades, depression, delinquency, and substance use. *Developmental Psychology*, 47, 233-247.
- Li, Y., Lynch, A., Kalvin, C., Liu, J., & Lerner, R. M. (2011). Peer relationships as a context for the development of school engagement during early adolescence. *International Journal of Behavioral Development*, 35, 329-342.
- Loukas, A., & Murphy, J. L. (2007). Middle school student perceptions of school climate: Examining protective functions on subsequent adjustment problems. *Journal of School Psychology*, 45(3), 293-309.
- Lubke, G., & Múthen, B. (2004). Applying multigroup confirmatory factor models for continuous outcomes to Likert scale data complicates meaningful group comparisons. *Structural Equation Modeling*, 11, 514 – 534.
- MacKinnon, D. (2008). *Introduction to statistical mediation analysis*. New York: Lawrence Erlbaum Associates.
- Marchand, G., & Skinner, E. A. (2007). Motivational dynamics of children's academic help-seeking and concealment. *Journal of Educational Psychology*, 99, 65-82.
- Marchant, G. J., Paulson, S. E., & Rothlisberg, B. A. (2001). Relations of middle school students' perceptions of family and school contexts with academic achievement. *Psychology in the Schools*, 38, 505-519.
- Marks, H. (2000). Student engagement in instructional activity: Patterns in the elementary, middle, and high school years. *American Educational Research Journal*, 37, 153-184.
- Marsh, H., & Young, A. (1998). Longitudinal structural equation models of academic self-concept and achievement: Gender differences in the development of math and English constructs. *American Educational Research Journal*, 35, 705 – 738.
- Martin, A., & Dowson, M. (2009) Interpersonal relationships, motivation, engagement, and achievement: Yields for theory, current issues, and educational practice. *Review of Educational Research*, 79, 327-365.
- McLaughlin, M. W., & Jones, A. (2009). What does it mean to be African American? Constructions of race and academic identity in an urban public high school. *American Educational Research Journal*, 46(1), 73-114.

- Meece, J. & Askew, K. (2011). Gender, schooling, and academic achievement. In S. Graham, J. Royer, M. Zeider, & R. Urdan (Eds.), *Educational psychology handbook* (Vol. 2). Washington, DC: American Psychological Association.
- Meece, J., & Eccles, J. (Eds.). (2010). *Handbook of research on schools, schooling, and human development*. NY: Routledge.
- Meece, J. L., Wigfield, A., & Eccles, J. S. (1990). Predictors of math anxiety and its influence on young adolescents' course enrollment intentions and performance in mathematics. *Journal of Educational Psychology*, 82, 60-70.
- Milfont, T. L., & Fischer, R. (2010). Testing measurement invariance across groups: Applications in cross-cultural research. *International Journal of Psychological Research*, 3, 112-131.
- Miller, D.C., & Warren, L.K. (2011). *Comparative Indicators of education in the United States and other G-8 Countries: 2011*. National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.
- Millsap, R., & Yun Tein, J. (2004). Assessing factorial invariance in ordered-categorical measures. *Multivariate Behavioral Research*, 39, 479 – 515.
- Morgan, S., & Mehta, J. (2004). Beyond the laboratory: Evaluating the survey evidence for the disidentification explanation of Black – White differences in achievement. *Sociology of Education*, 77, 82 – 101.
- Morrison, G. M., Robertson, L., & Laurie, B. (2002). Protective factors related to antisocial behavior trajectories. *Journal of Clinical Psychology*, 58(3), 277-290.
- Múthen, L., & Múthen, B. (1998 – 2012). Mplus user's guide. Seventh edition. Los Angeles, CA: Múthen & Múthen.
- National Center for Education Statistics (2009). *High school dropout and completion rates in the United States: 2007*. Retrieved July 12, 2011 from <http://nces.ed.gov/pubs2009/2009064.pdf>. Washington, DC: U.S. Department of Education.
- National Center for Education Statistics (2010). *The condition of education: 2010*. Retrieved August 3, 2012 from <http://nces.ed.gov/pubs2010/2010028.pdf>. Washington, DC: U.S. Department of Education.
- National Research Council & Institute of Medicine (2004). *Engaging schools: Fostering high school students' motivation to learn*. Washington, D.C.: National Academies Press.
- Neal, L., McCray, A., Webb-Johnson, G., & Bridgest, S. (2003). The effects of African American movement styles on teachers' perceptions and reactions. *Journal of*

- Special Education*, 37, 49 – 57.
- Nelson, M., & DeBacker, T. (2008). Achievement motivation in adolescents: The role of peer climate and best friends. *The Journal of Experimental Education*, 76, 170-189.
- Niemiec, C. P., & Ryan, R. M. (2009). Autonomy, competence, and relatedness in the classroom: Applying self-determination theory to educational practice. *Theory and Research in Education*, 7, 133-144.
- Noble, C., & Bradford, W. (2000). *Getting it right for boys and girls*. London: Routledge.
- Noddings, N. (1984). *Caring, a feminine approach to ethics and moral education*. Berkley: University of California press.
- Organization for Economic Co-operation and Development, (2010). *PISA 2009 results: What students know and can do: Student performance in reading, mathematics and science* (Volume I). Paris: OECD Publishing.
- Osterman, K. (2000). Students' need for belonging in the school community. *Review of Educational Research*, 70, 323-367.
- Parsons, J., Kaczala, C., & Meece, J. (1982). Socialization of achievement attitudes and beliefs: Parental influences. *Child Development*, 53, 322 – 339.
- Patrick, H., Ryan, A., & Kaplan, A. (2007). Early adolescents' perceptions of the classroom social environment, motivational beliefs, and engagement. *Journal of Educational Psychology*, 99, 83-98.
- Piaget, J. (1983). "Piaget's Theory". In P. Mussen (Ed.) *Handbook of child psychology*. Hoboken, NJ: Wiley.
- Pianta, R., Hamre, B., & Allen, J. (2012). Teacher-student relationships and engagement: Conceptualizing, measuring, and improving the capacity of classroom interactions. In S. L. Christenson, A. L. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 365-386). New York: Springer.
- Pittman, L. & Richmond, A. (2007). Academic and psychological functioning in late adolescence: The importance of school belonging. *The Journal of Experimental Education*, 75, 270-290.
- Preacher, K., & Hayes, A. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, 40, 879 – 891.
- Quintana, S., Boykin, W., Fuligni, A., Graham, S., Howes, C., Ortiz, S., & Worrell, F. (2012). *Ethnic and racial disparities in education: Psychology's contributions to understanding and reducing disparities*. Washington, DC: American Psychological Association.

- Rampey, B., Dion, G., Donahue, P. (2009). *The nation's report card: Trends in academic progress in reading and mathematics 2008*. Washington, DC: National Center for Education Statistics. Retrieved January 7, 2013 from <http://nces.ed.gov/nationsreportcard/pubs/main2008/2009479.asp>.
- Reise, S., Widaman, K., & Pugh, R. (1993). Confirmatory factor analysis and item response theory: Two approaches for exploring measurement invariance. *Psychological Bulletin*, 114, 552 – 566.
- Reschley, A., & Christenson, S. (2012). Jingle, jangle, and conceptual haziness: Evolution and future of the engagement construct. In S. L. Christenson, A. L. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 3-19). New York: Springer.
- Ripski, M. B., & Gregory, A. (2009). Unfair, unsafe, and unwelcome: Do high school students' perceptions of unfairness, hostility, and victimization in school predict engagement and achievement? *Journal of School Violence*, 8, 355–375.
- Roby, D. E. (2004). Research on school attendance and student achievement: A study of Ohio schools. *Educational Research Quarterly*, 28(1), 3-14.
- Roderick, M. (2003). What's happening to the boys? Early high school experiences and school outcomes among African American male adolescents in Chicago. *Urban Education*, 38, 538-607.
- Roeser, R., & Eccles, J. (1998). Adolescents' perceptions of middle school: Relation to longitudinal changes in academic and psychological adjustment. *Journal of Research on Adolescence*, 8, 123 – 158.
- Roeser, R., Midgley, C., & Urdan, T. (1996). Perceptions of the school psychological environment and early adolescents' psychological and behavioral functioning in school: The mediating role of goals and belonging. *Journal of Educational Psychology*, 88, 408-422.
- Rogoff, B. (2003). *The cultural nature of cognitive development*. New York: Oxford University Press.
- Rohrbeck, C.A., Ginsburg-Block, M.D., Fantuzzo, J.W., & Miller, T.R. (2003). Peer-assisted learning interventions with elementary school students: A meta-analytic review. *Journal of Educational Psychology*, 95, 240-257.
- Rosen, L., Beron, K., & Underwood, M. (2012). Assessing peer victimization across adolescence: Measurement invariance and developmental change. *Psychological Assessment*, 25, 1 – 11.

- Roth, G., Assor, A., Niemiec, C. P., Ryan, R. M., & Deci, E. L. (2009). The emotional and academic consequences of parental conditional regard: Comparing conditional positive regard, conditional negative regard, and autonomy support as parenting practices. *Developmental Psychology*, 45, 1119–1142.
- Rowley, S., Kurtz-Costes, B., & Cooper, S. (2010). The schooling of African American children. In J. Meece & J. Eccles (Eds.), *Handbook of research on schools, schooling, and human development* (pp. 275-292). New York: Routledge.
- Rumberger, R., & Lim, S. (2008). *Why students drop out of school: A review of 25 years of research* (California Dropout research Project Report #15). Santa Barbara, CA: University of California.
- Ryan, R., & Deci, E., (2000). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology*, 25, 54 – 67.
- Ryan, A. M., & Patrick, H. (2001). The classroom social environment and changes in adolescents' motivation and engagement during middle school. *American Educational Research Journal*, 38, 437–460.
- Ryan, A., & Shim, S. (2008). An exploration of young adolescents' social achievement goals and social adjustment in middle school, *Journal of Educational Psychology*, 100, 672 – 687.
- Sakiz, G., Pape, S. J., & Hoy, A. (2012). Does Perceived Teacher Affective Support Matter for Middle School Students in Mathematics Classrooms?. *Journal of School Psychology*, 50, 235-255.
- Sanchez, B., Colon, Y., & Esparza, P. (2005). The role of sense of school belonging and gender in the academic adjustment of Latino adolescents. *Journal of Youth and Adolescence*, 34, 619-628.
- Schmakel, P. (2008). Early adolescents' perspectives on motivation and achievement in academics. *Urban Education*, 43, 723-749.
- Schunk, D., Pintrich, P., & Meece, J. (2008). *Motivation in education : theory, research, and applications*. Upper Saddle River, N.J.: Pearson/Merrill Prentice Hall.
- Shernoff, D. & Schmidt, J.A. (2008). Further evidence of an engagement-achievement paradox among U.S. high school students. *Journal of Youth and Adolescence*, 37, 564-580.
- Shevlin, P. (Executive Producer), (2010, April 10). *CBS Evening News* [Television broadcast]. New York, NY: Capitol Broadcasting Service.
- Shin, R., Daly, B., & Vera, E. (2007). The relationships of peer norms, ethnic identity, and peer support to school engagement in urban youth. *Professional School Counseling*, 10, 379 – 388.
- Silverman I., (2003). Gender differences in delay of gratification: a meta-analysis. *Sex*

- Roles*, 49, 451–463.
- Sinclair, M.F., Christenson, S.L., Lehr, C.A., & Anderson, A.R. (2003). Facilitating student engagement: Lessons learned from Check & Connect Longitudinal studies. *The California School Psychologist*, 8, 29-42.
- Sinclair, M.F., Christenson, S.L., & Thurlow, M.L. (2005). Promoting school completion of urban secondary youth with emotional or behavioral disabilities. *Exceptional Children*, 71, 465-482.
- Skinner, E. A., & Belmont, M. J. (1993). Motivation in the classroom: Reciprocal effects of teacher behavior and student engagement across the school year. *Journal of Educational Psychology*, 85, 571-81.
- Skinner, E., Furrer, C., Marchand, G., & Kindermann, T. (2008). Engagement and disaffection in the classroom: Part of a larger motivational dynamic? *Journal of Educational Psychology*, 100, 765-781.
- Skinner, E., Kindermann, T., Connell, J., & Wellborn, J. (2009). Engagement and disaffection as organizational constructs in the dynamics of motivational development. In K. Wentzel & A. Wigfield (Eds.), *Handbook of motivation at school* (pp. 223-246). New York: Routledge.
- Skinner, E., & Pitzer, J. (2012). Developmental dynamics of student engagement, coping, and everyday resilience. In S. L. Christenson, A. L. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 21-44). New York: Springer.
- Skinner, E. A., & Wellborn, J. G. (1994). Coping during childhood and adolescence: A motivational perspective. In D. L. Featherman, R. M. Lerner, M. Perlmutter (Eds.), *Life-span development and behavior, Vol. 12* (pp. 91-133). Hillsdale, NJ England: Lawrence Erlbaum Associates, Inc.
- Smalls, C., & Cooper, S. (2012). Racial group regard, barrier socialization, and African American adolescents' engagement: Patterns and processes by gender. *Journal of Adolescence*, 35, 887-897.
- Smalls, C., White, R., Chavous, T., & Sellers, R. (2007). Racial ideological beliefs and racial discrimination experiences as predictors of academic engagement among African American adolescents. *Journal of Black Psychology*, 100, 765 – 781.
- Smith, J. B., Lee, V. E., & Newmann, F. M. (2001). *Instruction and achievement in Chicago elementary schools. Improving Chicago's schools*. Chicago, IL: Consortium on Chicago School Research.
- Sommers, C. (2000). *The war against boys: How misguided feminism is harming our young men*. New York: Simon & Shuster, Inc.
- UCLA: Statistical Consulting Group. *STATA Annotated Output, Probit Regression*. Retrieved July 31, 2013 from

http://www.ats.ucla.edu/stat/stata/output/Stata_Probit.htm.

- Steenkamp, J., & Baumgartner, H. (1998). Assessing measurement invariance in cross-national consumer research. *Journal of Consumer Research*, 25, 78 – 107.
- Steward, R., Steward, A., Blair, J., Hanik, J., & Hill, M. (2008). School attendance revisited: A study of urban African American students' grade point averages and coping strategies. *Urban Education*, 43, 518–536.
- Steele, C. (1997). A threat in the air: How stereotypes shape intellectual identity and performance. *American Psychologist*, 52, 613 – 629.
- Sum, A., Khatiwada, I., McLaughlin, J., & Palma, S. (2009). *The consequences of dropping out of high school*. Boston, MA: Center for Labor Market Studies, Northeastern University.
- Tabachnick, B., & Fidell, L. (2013). Using multivariate statistics (6th edition). Boston: Allyn and Bacon.
- Tennenbaum, H., & Ruck, M. (2007). Are teachers' expectations different for racial minority than for European American students? A meta-analysis. *Journal of Educational Psychology*, 99, 253 – 273.
- Tucker, C. M., Zayco, R. A., & Herman, K. (2002). Teacher and child variables as predictors of academic engagement among low-income African American children. *Psychology in the Schools*, 39, 477-488.
- Tyler, K., Uqdah, A., Dillihunt, M., Beatty-Hazelbaker, R., Conner, T., Gadson, N., Henchy, A., Hughes, T., Mulder, S., Owens, E., Roan-Belle, C., Smith, L., & Stevens, R. (2008). Cultural discontinuity: Toward a quantitative investigation of a major hypothesis in education. *Educational Researcher*, 7, 280–297.
- Tyson, K., Darity, W., & Castellino, D. R. (2005). It's not “a Black thing”: Understanding the burden of acting White and other dilemmas of high achievement. *American Sociological Review*, 70(4), 582-605.
- Ueno, K. (2009). Same-race friendships and school attachment: Demonstrating the interaction between personal network and school composition. *Sociological Forum*, 24, 515 – 537.
- United States Bureau of Labor Statistics (2012). *Education and training outlook for occupations, 2012 – 2022*. Retrieved January 3, 2013 from http://www.bls.gov/emp/ep_edtrain_outlook.pdf.
- United States Census Bureau (May, 2010). *The next four decades: The older population in the United States 2010 to 2050*. Retrieved October 5, 2011, from

- http://www.aoa.gov/aoaroot/aging_statistics/future_growth/DOCS/p25-1138.pdf.
- United States Department of Labor (2007). *The STEM workforce challenge: The role of the public workforce system in a national solution for a competitive Science, Technology, Engineering, and Mathematics (STEM) workforce*. Washington, DC.
- Usher, A. (2011). **Update with 2009-10 data and five-year trends** *How many schools and districts have not made adequate yearly progress?* Washington, DC: Center on Education Policy.
- Vandenberg, R., & Lance, C. (2000). A review and synthesis of the measurement invariance literature: Suggestions, practices and recommendations for organizational research. *Organizational Research Methods*, 3, 4 – 70.
- Van Ryzin, M. J. (2011). Protective factors at school: Reciprocal effects among adolescents' perceptions of the school environment, engagement in learning, and hope. *Journal of Youth and Adolescence*, 40, 1568-1580.
- Vygotsky, L. (1978). *Mind in society. The development of higher psychological processes*. Cambridge, MA: Harvard University Press.
- Walker, C. O., & Greene, B. A. (2009). The Relations between student motivational beliefs and cognitive engagement in high school. *Journal of Educational Research*, 102, 463-472.
- Wang, M. (2009). School climate support for behavioral and psychological adjustment: Testing the mediating effect of social competence. *School Psychology Quarterly*, 24, 240-251.
- Wang, M., & Dishion, T. (2012). The trajectories of adolescents perceptions of school climate, deviant peer affiliation, and behavioral problems during the middle school years. *Journal of Research on Adolescence*, 22, 40-53.
- Wang, M., & Eccles, J. S. (2012). Adolescent behavioral, emotional, and cognitive engagement trajectories in school and their differential relations to educational success. *Journal of Research on Adolescence*, 22, 31-39.
- Wang, M., & Eccles, J. S. (2012b). Social support matters: Longitudinal effects of social support on three dimensions of school engagement from middle to high school. *Child Development*, 83, 877-895.
- Wang, M., & Holcombe, R. (2010). Adolescents' perceptions of school environment, engagement, and academic achievement in middle school. *American Educational Research Journal*, 47, 633-662.
- Wang, M., Selman, R., Dishion, T., & Stormshak, E. (2010). A tobit regression analysis of the covariation between middle school students' perceived school climate and behavioral problems. *Journal of Research on Adolescence*, 20, 274-286.

- Way, N., Reddy, R., Rhodes, J. (2007). Students' perceptions of school climate during the middle school years: Associations with trajectories of psychological and behavioral adjustment. *American Journal of Community Psychology*, 40, 194-213.
- Weaver-Hightower, M. (2003). The "boy turn" in research on gender and education. *Review of Educational Research*, 73, 471-498.
- Wentzel, K. R. (1993). Does being good make the grade? Social behavior and academic competence in middle school. *Journal of Educational Psychology*, 85, 357.
- Wentzel, K. R. (1994). Relations of social goal pursuit to social acceptance, classroom behavior, and perceived social support. *Journal of Educational Psychology*, 86, 173-182.
- Wentzel, K. R. (1997). Student motivation in middle school: the role of perceived pedagogical caring. *Journal of Educational Psychology*, 89, 411-419.
- Wentzel, K. (2010). Students' relationships with teachers. In J. Meece & J. Eccles (Eds.) *Handbook of research on schools and schooling, and human development*. New York: Routledge.
- Wentzel, K., Barry, C., & Caldwell, K. (2004). Friendships in middle school: Influences on motivation and school adjustment. *Journal of Educational Psychology*, 96, 195 – 203.
- Wentzel, K. R., Battle, A., Russell, S. L., & Looney, L. B. (2010). Social supports from teachers and peers as predictors of academic and social motivation. *Contemporary Educational Psychology*, 35, 193-202.
- Wentzel, K. R., & Caldwell, K. (1997). Friendships, peer acceptance, and group membership: Relations to academic achievement in middle school. *Child Development*, 68, 1198-1209.
- Wentzel, K., Filisetti, L., & Looney, L. (2007). Adolescent prosocial behavior: The role of self-processes and contextual clues. *Child Development*, 78, 895 – 910.
- Wentzel, K., & Wigfield, A. (1998). Academic and social motivational influences on students' academic performance. *Educational Psychology Review*, 10, 155 – 175.
- Wentzel, K. & Wigfield, A. (2007). Motivational interventions that work: Themes and remaining issues. *Educational Psychologist*, 42, 261-271.
- Widaman, K. (2006). III. Missing data: What to do with or without them. In K. McCartney, M. Burchinal, & K. Bub (Eds.), *Best practices in quantitative methods for developmentalists* (pp. 42 – 64). *Monographs of the Society for Research in Child Development*, 71(3, Serial No. 285).
- Wigfield, A., & Eccles, J. S. (2000). Expectancy-value theory of achievement motivation. *Contemporary Educational Psychology*, 25, 68-81.
- Wigfield A., Eccles J., Schiefele U., Roeser R., & Davis-Kean P. (2006). Development of

- achievement motivation. In Damon W. (Series Ed.) & Eisenberg N. (Vol. Ed.), *Handbook of child psychology: Vol. 3. Social, Emotional, and Personality Development* (6th ed., pp. 933–1002). New York: John Wiley.
- Yazzie-Mintz, E. (2009). *Charting the path from engagement to achievement: A report of the 2009 High School Survey of Student Engagement*. Bloomington, IN: Indiana University, Center for Evaluation and Education Policy. Retrieved October 4, 2011, from http://ceep.indiana.edu/hssse/images/HSSSE_2010_Report.pdf.
- You, S., & Sharkey, J. (2009). Testing a developmental-ecological model of student engagement: A multilevel latent growth curve analysis. *Educational Psychology*, 29, 659-684.
- Yu, C.-Y. & Muthén, B. (2002). Evaluation of model fit indices for latent variable models with categorical and continuous outcomes. Technical report.
- Zimmerman, B. (1990). Self-regulated learning and academic achievement: An overview. *Educational Psychologist*, 25, 3 – 18.
- Zimmerman, B., & Kitsantas, A. (2007). The hidden dimension of personal competence. In A. Elliot & C. Dweck (Eds.), *Handbook of competence and motivation* (pp. 509 – 526). New York: Guilford Press.
- Zimmer-Gembeck, M. J., Chipuer, H. M., & Hanisch, M., Creed, P., & McGregor, L. (2006). Relationships at school and stage-environment fit as resources for adolescent engagement and achievement. *Journal of Adolescence*, 29, 911-933.
- Zumbo, B. D., Gadermann, A. M., & Zeisser, C.. (2007). Ordinal versions of coefficients Alpha and Theta For Likert rating scales. *Journal of Modern Applied Statistical Methods*, 6, 21-29.